Redesigning High School Mathematics Curriculum to Enhance College Readiness

Alicia Sanfillippo

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Redesigning High School Mathematics Curriculum to Enhance College Readiness

By Alicia Sanfillippo

Mentors:
Dr. Tabitha Mingus
Ms. Leslie Church
Abstract

Redesigning High School Mathematics Curriculum to Enhance College Readiness

By Alicia Sanfillippo

As a peer tutor and academic coach at Western Michigan University since Fall 2014, I frequently assisted students with mathematics and science courses. Working closely with university students made me realize that many students lacked important skills that I would expect to have been developed prior to college. The skills that I realized students were lacking with respect to math literacy were pattern recognition, the ability to transfer skills, and comprehension and use of mathematical language. I set out to develop these skills as I prepared for an internship in an remedial Algebra II class at Kalamazoo Central High School. My project focused on the material developed to utilize throughout the trimester, aligned with the pacing guide provided by the school and adjusted to meet the needs of the students.

I compiled the material used and, when necessary, made changes after implementing them in the classroom. The trimester covered the mathematical topics of domain and range, functions, function notation, polynomials, and factoring. Included in the collection are lesson plans, daily warm-ups, templates for warm-ups, notes, homework, and quizzes, example notes, scaffolded and differentiated activities, and assessments. I’ve also provided additional items for skill-building, such as drills for adding and subtracting and a textbook hunt. Some of the assignments were borrowed from other resources, including my mentor teacher Leslie Church, Holt McDougal online textbooks, Kuta Software, Desmos, Extended Algebra, GradeAmathhelp.com, Mathworksheetsland.com, Math-Aids.com, and bellevillebulldogs.tripod.com. Many of the items were hand-made using programs such as Microsoft Word, Microsoft Publisher, and Desmos. The reason for having to make my own activities to use was to meet the needs of the students with which I was interacting. Although it took longer to prepare, I felt that these products better suited my students and my purpose.

I am interested in continuing to develop and alter products to utilize with students to develop their math literacy. I hope to build student skills and confidence to increase success rates at the college level across all subjects, not just mathematics. The materials I have compiled for my thesis will continue to evolve, and I look forward to challenging myself to develop lessons and materials to improve student performance and appreciation for mathematics.
REDESIGNING HIGH SCHOOL CURRICULUM TO ENHANCE COLLEGE READINESS

Alicia Sanfillippo
Honors Thesis
Fall 2017
As a peer tutor and academic coach with Student Success Services at WMU since Fall 2014, I frequently assisted students with mathematics and science courses. I came to realize that many students lacked important skills that I would expect to have been developed prior to college. The skills that I realized students were lacking with respect to math literacy were pattern recognition, the ability to transfer skills, and deciphering and using mathematical language. I set out to develop these skills in secondary mathematics.
BACKGROUND

For my teaching internship, I was placed in a high school mathematics class in the Kalamazoo Public Schools District. Under the mentorship of Ms. Leslie Church at Kalamazoo Central High School, I prepared for an internship in the four-trimester Algebra II course, which was designed to progress through the Algebra II material at a slower rate. My thesis project, therefore, focused on the material developed to utilize throughout the first trimester, aligned with the pacing guide provided by the school and adjusted to meet the needs of the students.
TARGET SKILLS

- Recognizing patterns
- Transferring skills
- Writing about mathematics
- Self-reflecting
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<td>Prime Factorization</td>
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<tr>
<td>GCF</td>
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</table>
- Factoring Out Monomials
- Factoring Quadratics (Trinomials into Binomials)

4. Factoring Out Monomials (Breakdown)
5. Factoring Out Polynomials (Easy)
6. Factoring Out Polynomials (Hard)
7. Shuffle Match GCF
8. 5-Page Factoring Practice
9. Find the Pair
10. Factor Quadratics with LC 1
11. Prep for Assessment
12. Assessment Part 1 (Mixed Versions)

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<td>3. 2-Step Factoring (GCF Mix)</td>
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<td>4. Solving for Zeros (Degree 2)</td>
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<td>5. Solving for Zeros (Degree 3+)</td>
<td>5. Solving for Zeros (Degree 3+)</td>
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<td>6. Factoring Puzzle</td>
<td>6. Factoring Puzzle</td>
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<td>7. Factor then Solve for Zeros</td>
<td>7. Factor then Solve for Zeros</td>
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<td>9. Shuffle Cards Match</td>
<td>9. Shuffle Cards Match</td>
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<tr>
<td>10. Review Activity</td>
<td>10. Review Activity</td>
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<tr>
<td>12. Option 2: Factoring Song/Play</td>
<td>12. Option 2: Factoring Song/Play</td>
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Additional Resources

In addition to my own creations, the following sources have been consulted in the collection of utilized materials.

- Creations by Leslie Church
- Holt-McDougal Online Textbook
- Kuta Software
- Desmos
- Extended Algebra
- Math-Aids.com
- Mathworksheetsland.com
- GradeAmathhelp.com
- Bellevillebulldogs.tripod.com
TEMPLATES
WARM-UP  Week of ________________________

MONDAY

TUESDAY
WEDNESDAY

THURSDAY

FRIDAY
Rate my understanding: Tell us in a complete sentence how you feel about your level of understanding of today’s lesson. Use a rating scale of 1 to 5 (1—I don’t have a clue, 2—kind of understood something, 3—shakey bakey, 4—got most of it, 5—I could teach it). Be sure to explain your choice of rating.
Summarize today’s learning in **6 complete sentences**. This does not mean that you talk about the activities we did (i.e. “we did 3 worksheets on isolating the variable”). An example of what is expected would be “Today, I learned about solving equations. This means that I isolate the variable. To isolate the variable, I need to use inverse operations. Inverse operations are...”

Create 2 of your OWN problems that are like those done in class. You must **show how to solve** your problems. If you copy examples off notes or worksheets, you will receive a zero!
CURRICULUM MATERIAL
Week 1
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 9/4/17

Unit 1: Pre-Assessment and Review (Functions, Linear Functions, Exponents)

Target Skills

Day 1 Skill: Distributive Property, Simplification, Substitution

Day 2 Skill: Solving 1-Step, 2-Step, and Multi-Step Equations
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<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
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<tr>
<td>WARM-UP</td>
<td>None</td>
<td>Type I: What do you struggle with in mathematics class?</td>
<td>Type I: What are the top 5 songs on your playlist?</td>
<td>TYPE II: Simplify expression</td>
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<tr>
<td>(5 minutes)</td>
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<tr>
<td>NOTES</td>
<td>NO SCHOOL</td>
<td>None</td>
<td>None</td>
<td>Distributive property</td>
<td>Solving 1-Step</td>
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<tr>
<td>(8-10 minutes)</td>
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<td></td>
<td></td>
<td>Simplifying</td>
<td>Solving 2-Step</td>
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<td></td>
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<td></td>
<td>Substituting</td>
<td>Solving Multistep</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(evaluating)</td>
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<tr>
<td>TASK 1</td>
<td>Go over syllabus (10 minutes)</td>
<td>Pre-Assessment (10-15 minutes)</td>
<td>Distributive property</td>
<td>Solving 1 and 2 Steps (25 problems) (10-12 minutes)</td>
<td>1 copy for us</td>
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<td></td>
<td>(20 problems)-worksheet will include</td>
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<td>progressively harder problems</td>
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<td>(10-15 minutes)</td>
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<td>Answer key on back</td>
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<td>TASK 2</td>
<td>Find out 3 things about each person (15 minutes)</td>
<td>Footprint Profile (45 minutes)</td>
<td>Simplifying expressions (20 problems)-</td>
<td>Multistep (25 problems) (10-12 minutes) 1 copy for us</td>
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<td>worksheet will include</td>
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<td>(10-15 minutes)</td>
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<td>Answer key on back</td>
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<td>TASK 3</td>
<td>Substituting/Evaluating (20 problems) - worksheet will include progressively harder problems (10-15 minutes) 1 copy of answer key</td>
<td>Solving for a variable (20 problems) (10-15 minutes) 1 copy answer key for us</td>
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<td>Quiz (6-10 minutes)</td>
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<td>Clean Up (5 minutes)</td>
<td>Sentence rating how they feel about today’s lesson</td>
<td>Sentence rating how they feel about today’s lesson</td>
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<td>HOMEWORK</td>
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<td>Informational sheet (not in profile)</td>
<td>Standard summary + create 2 problems</td>
<td>Standard summary</td>
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<td>• Worksheet-Solve 2-Step</td>
<td>• Worksheet-Solve Multi-Step</td>
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(Provided by pacing guide) | N/A | N/A | N/A | N/A |
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I will...</td>
<td>I will use distributive property, simplify, and evaluate.</td>
<td>I will solve 1-, 2-, and multistep equations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCSS</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
**algebraic expression**: has letters, numbers, and operations (+, -, *, ÷)

ex: \(2x + 6\)

**variable**: letter that stands for a number

ex: \(x, y, z\)

**coefficient**: number in front of a variable

ex: \(2x + 3y\)

**distributive property**: outside times inside

ex: \(2(3x - 4)\) → \(6x - 8\)

**simplify**: combine like terms

ex: \(\frac{3x}{5} + 2 + \frac{6x}{5}\) → \(9x + 2\) → \(x = 6\)

**evaluate**: get an answer

ex: \(3x + 2; x = 6\) → \(3(6) + 2 = 20\)
EXAMPLE 1

Dist. Property

\[ 3(2x + 4y - 7) - 4x \]

\[ 6x + 12y - 21 - 4x \]

EXAMPLE 2

Simplify

\[ 6x - 4y + 2 - 3x + 10y - 8 \]

\[ 3x + 6y - 6 \]

EXAMPLE 3

Evaluate

\[ 3x + 2y + 4xy \] when \( x=2 \) and \( y=4 \)

\[ 3(2) + 2(4) + 4(2)(4) \]

\[ 6 + 8 + 32 = 46 \]
Simplify each expression.

1) \(- (1 + 4k)\)
2) \(6(a + 9)\)
3) \(10(x + 1)\)
4) \(-6(7 - 9n)\)
5) \(-7(r - 10)\)
6) \(-3(x + 2)\)
7) \(5(2 + 4x)\)
8) \(-4(x - 3)\)
9) \(-8(5x - 2) - 5x\)
10) \(-8n - 3(4n - 7)\)
11) \(-7(4n + 5) - 2n\)
12) \(-10(-8p + 3) - 8\)
13) \(10m + 7(-6 + 2m)\)
14) \(-7(x + 4) - 3x\)
15) \(-1 - 8(-7n + 6)\)
16) \(9(-4m - 4) - 2\)
17) \(-10(p + 8) + 5(-9p - 3)\)
18) \(- (k - 1) - (2k - 5)\)
19) \(4(8 - 3m) - (m + 8)\)
20) \(8(r - 7) + 9(6 + 4r)\)
21) \(4(8 - 10x) - 5(-8x + 1)\)
22) \(6(2p - 2) - 7(-4 - 7p)\)
23) \(6(1 - 3x) + 4(x - 2)\)
24) \(10(1 - 8x) + 7(1 + x)\)
Combining Like Terms

Simplify each expression.

1) \(-6k + 7k\)  
2) \(12r - 8 - 12\)

3) \(n - 10 + 9n - 3\)  
4) \(-4x - 10x\)

5) \(-r - 10r\)  
6) \(-2x + 11 + 6x\)

7) \(11r - 12r\)  
8) \(-v + 12v\)

9) \(-8x - 11x\)  
10) \(4p + 2p\)

11) \(5n + 11n\)  
12) \(n + 4 - 9 - 5n\)

13) \(12r + 5 + 3r - 5\)  
14) \(-5 + 9n + 6\)
15) $n - 4 - 9$

16) $4n - n$

17) $-3x - 9 + 15x$

18) $-9k + 8k$

19) $-16n - 14n$

20) $15n - 19n$

21) $-4 + 7(1 - 3m)$

22) $-5n + 3(6 + 7n)$

23) $-2n - (9 - 10n)$

24) $10 - 5(9n - 9)$

25) $9a + 10(6a - 1)$

26) $-9(6m - 3) + 6(1 + 4m)$

27) $-10(1 - 9x) + 6(x - 10)$

28) $5(-2n + 4) + 2(n + 3)$

29) $-3(10b + 10) + 5(b + 2)$

30) $-7(n + 3) - 8(1 + 8n)$
Evaluating Expressions

Evaluate each using the values given.

1) \( y \div 2 + x \); use \( x = 1 \), and \( y = 2 \)

2) \( a - 5 - b \); use \( a = 10 \), and \( b = 4 \)

3) \( p^2 + m \); use \( m = 1 \), and \( p = 5 \)

4) \( y + 9 - x \); use \( x = 1 \), and \( y = 3 \)

5) \( m + p \div 5 \); use \( m = 1 \), and \( p = 5 \)

6) \( y^2 - x \); use \( x = 7 \), and \( y = 7 \)

7) \( z(x + y) \); use \( x = 6 \), \( y = 8 \), and \( z = 6 \)

8) \( x + y + y \); use \( x = 9 \), and \( y = 10 \)

9) \( p^3 + 10 + m \); use \( m = 9 \), and \( p = 3 \)

10) \( 6q + m - m \); use \( m = 8 \), and \( q = 3 \)

11) \( p^2m \div 4 \); use \( m = 4 \), and \( p = 7 \)

12) \( y - (z + z^2) \); use \( y = 10 \), and \( z = 2 \)

13) \( z - (y \div 3 - 1) \); use \( y = 3 \), and \( z = 7 \)

14) \( (y + x) \div 2 + x \); use \( x = 1 \), and \( y = 1 \)
15) \( p - (9 - (m + q)) \); use \( m = 4 \), \( p = 5 \), and \( q = 3 \)

16) \( (a^2 - b) \div 6 \); use \( a = 5 \), and \( b = 1 \)

17) \( (6 + h^2 - j) \div 2 \); use \( h = 6 \), and \( j = 4 \)

18) \( y - (4 - x - y \div 2) \); use \( x = 3 \), and \( y = 2 \)

19) \( x^3 \div 3 - y \); use \( x = 3 \), and \( y = 1 \)

20) \( (p + q)^2 - (5 - 5) \); use \( p = 1 \), and \( q = 1 \)

21) \( 12k - h^2 \); use \( h = 2 \), and \( k = 3 \)

22) \( y \div 5 + 1 + x \div 6 \); use \( x = 6 \), and \( y = 5 \)

23) \( 6 \div 6 + z + x - y \); use \( x = 2 \), \( y = 5 \), and \( z = 6 \)

24) \( y - z + xz \div 6 \); use \( x = 3 \), \( y = 4 \), and \( z = 4 \)

25) \( \frac{y}{2} + x + 4 + z + y \); use \( x = 7 \), \( y = 2 \), and \( z = 4 \)

26) \( c \times \frac{bc}{4} - (7 - a) \); use \( a = 4 \), \( b = 8 \), and \( c = 5 \)
Algebraic equation: contains variables, numbers, operations, and an equal sign

example: $2x + 7 = 10$

Isolate the variable: get the variable ($x$) by itself

example: $x = 32$

Inverse operations: do the operation that is OPPOSITE

Steps

1 - Distributive Property (if it is necessary)

2 - Simplify

3 - Isolate the variable
EXAMPLE 1

1-Step Equation

\[ 4.5 = \frac{x}{4} \times 4 \]

\[ 20 = x \]

EXAMPLE 2

2-Step Equation

\[ \frac{x}{3} - 6 = 2 \]

\[ x = 24 \]

EXAMPLE 3

MultiStep Equation

\[ 2(x - 4) = 12 \]

\[ 2x - 8 = 12 \]

\[ 2x = 20 \]

\[ x = 10 \]
One-Step Equations

Solve each equation.

1) \(26 = 8 + v\)

2) \(3 + p = 8\)

3) \(15 + b = 23\)

4) \(-15 + n = -9\)

5) \(m + 4 = -12\)

6) \(x - 7 = 13\)

7) \(m - 9 = -13\)

8) \(p - 6 = -5\)

9) \(v - 15 = -27\)

10) \(n + 16 = 9\)

11) \(-104 = 8x\)

12) \(14b = -56\)

13) \(-6 = \frac{b}{18}\)

14) \(10n = 40\)
15) \[ \frac{v}{8} = 2 \]

16) \[ 16 = \frac{k}{11} \]

17) \[ -15x = 0 \]

18) \[ -17x = -204 \]

19) \[ 21 = -7n \]

20) \[ \frac{m}{4} = -13 \]

21) \[ -126 = 14k \]

22) \[ -143 = -11x \]

23) \[ -16 + x = -15 \]

24) \[ -5 = \frac{a}{18} \]

25) \[ -17 = x - 15 \]

26) \[ n - 8 = -10 \]

27) \[ \frac{v}{7} = 8 \]

28) \[ a + 11 = 20 \]

29) \[ -7 + m = 8 \]

30) \[ 18 + m = 8 \]
Two-Step Equations

Solve each equation.

1) \( 6 = \frac{a}{4} + 2 \)

2) \( -6 + \frac{x}{4} = -5 \)

3) \( 9x - 7 = -7 \)

4) \( 0 = 4 + \frac{n}{5} \)

5) \( -4 = \frac{r}{20} - 5 \)

6) \( -1 = \frac{5 + x}{6} \)

7) \( \frac{v + 9}{3} = 8 \)

8) \( 2(n + 5) = -2 \)

9) \( -9x + 1 = -80 \)

10) \( -6 = \frac{n}{2} - 10 \)

11) \( -2 = 2 + \frac{v}{4} \)

12) \( 144 = -12(x + 5) \)
13) \(-15 = -4m + 5\)  

14) \(10 - 6v = -104\)

15) \(8n + 7 = 31\)  

16) \(-9x - 13 = -103\)

17) \(\frac{n + 5}{-16} = -1\)  

18) \(-10 = -10 + 7m\)

19) \(-10 = 10(k - 9)\)  

20) \(\frac{m}{9} - 1 = -2\)

21) \(9 + 9n = 9\)  

22) \(7(9 + k) = 84\)

23) \(8 + \frac{b}{-4} = 5\)  

24) \(-243 = -9(10 + x)\)
Multi-Step Equations

Solve each equation.

1) \(-20 = -4x - 6x\)
2) \(6 = 1 - 2n + 5\)

3) \(8x - 2 = -9 + 7x\)
4) \(a + 5 = -5a + 5\)

5) \(4m - 4 = 4m\)
6) \(p - 1 = 5p + 3p - 8\)

7) \(5p - 14 = 8p + 4\)
8) \(p - 4 = -9 + p\)

9) \(-8 = -(x + 4)\)
10) \(12 = -4(-6x - 3)\)

11) \(14 = -(p - 8)\)
12) \(-(7 - 4x) = 9\)

13) \(-18 - 6k = 6(1 + 3k)\)
14) \(5n + 34 = -2(1 - 7n)\)

15) \(2(4x - 3) - 8 = 4 + 2x\)
16) \(3n - 5 = -8(6 + 5n)\)

17) \(-1 + 7x - 6(-7 - x) = 36\)
18) \(-3(4x + 3) + 4(6x + 1) = 43\)

19) \(24a - 22 = -4(1 - 6a)\)
20) \(-5(1 - 5x) + 5(-8x - 2) = -4x - 8x\)
Week 2
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 9/11/17

Unit 1: Pre-Assessment and Review (Functions, Linear Functions, Exponents)

Target Skills

Day 1 Skill: Graphing points
Day 2 Skill: Graphing lines
Day 3/4 Skill: Domain and Range/Input and Output
<table>
<thead>
<tr>
<th>Time</th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARM-UP (5 minutes)</td>
<td>Type I: What are your trimester goals for this class and in general?</td>
<td>Type II: Plotted points-Given the graph, which points are plotted correctly and why? Which are plotted incorrectly and why?</td>
<td>Type I: I can’t stand it when...</td>
<td>Type II: Given the graph, tell us the domain and range</td>
<td>Type I: What is your favorite quote?</td>
</tr>
<tr>
<td>NOTES (8-10 minutes)</td>
<td>Graphing points</td>
<td>Graphing lines</td>
<td>Domain and Range Input and Output</td>
<td>Review</td>
<td>None</td>
</tr>
<tr>
<td>TASK 1</td>
<td>Easy character graph (done as a class) (10-15 minutes)</td>
<td>Graphing lines from slope-intercept form (10-12 minutes)</td>
<td>Identify domain/range in tables and graphs (10-15 minutes)</td>
<td>Group/individual activity with mini worksheets Distribute/Simplify Graph lines Solve equation Evaluate Domain/Range (55 minutes)</td>
<td>Card sort/match (vocabulary) First 10 minutes—no notes, then allow notes for remainder of class (60 minutes)</td>
</tr>
<tr>
<td>TASK 2</td>
<td>Pick your own easy/medium character graph</td>
<td>Complete individually (10-15 minutes)</td>
<td>Given the lines, come up with the equation (10-12 minutes)</td>
<td>Given equations, create input/output table (10-15 minutes)</td>
<td>None</td>
</tr>
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<tr>
<td>TASK 3</td>
<td>Pick your own medium/hard character graph</td>
<td>Complete individually (10-15 minutes)</td>
<td>Graphing lines from standard form (10-15 minutes)</td>
<td>From Task 2’s tables, graph the equations and provide domain and range (10-15 minutes)</td>
<td>None</td>
</tr>
<tr>
<td>Quiz (6-10 minutes)</td>
<td>Plot the points or identify coordinate that is plotted</td>
<td>Example one of each</td>
<td>2 Problems from domain/range from graph worksheet</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>CLOSURE (2-4 minutes)</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on today’s lesson</td>
<td>Turn in all final worksheets regardless of noncompletion</td>
<td>Clean Up</td>
</tr>
<tr>
<td>Materials</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
</tr>
</tbody>
</table>
- Notes (gold sheet)
- Quiz (tan sheet)
- Vertical and horizontal graphs
- 5 character graphing options
- 1 mystery graphing (snake)
- Rulers (if desired)
- Whiteout (if needed)

- Notes (gold sheet)
- Quiz (tan sheet)
- Homework (green sheet)
- Rulers (if desired)
- Worksheet-Graphing line given linear equation
- Worksheet-Writing linear equation given graphed line

- Notes (gold sheet)
- Quiz (tan sheet)
- Homework (green sheet)
- Worksheet-Domain and range from tables
- Worksheet-Domain and range from graphs worksheet

- Review Worksheets for Round Robin
- Quiz (tan sheet)
- Homework (green sheet)

- Vocab Card Sort
- Scissors
- Glue

Vocabulary
- coordinate point
- coordinate plane
- x-axis
- y-axis

- linear equation
- slope
- x-intercept
- y-intercept

- input
- output
- independent variable
- dependent variable

- coordinate point
- coordinate plane
- x-axis
- y-axis

N/A
<table>
<thead>
<tr>
<th>I can...</th>
<th>N/A</th>
<th>• I can graph a linear function</th>
<th>• I can define relation, domain and range</th>
<th>• I can define relation, domain and range</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will...</td>
<td>• I will be able to graph and identify coordinate points on a graph</td>
<td>• I will be able to graph linear equations</td>
<td>• I will be able to find domain and range</td>
<td>• I will be able to find domain and range</td>
<td>N/A</td>
</tr>
<tr>
<td>CC Standards</td>
<td>HSF-IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
element of the domain exactly one element of the range. If \( f \) is a function and \( x \) is an element of its domain, then \( f(x) \) denotes the output of \( f \) corresponding to the input \( x \). The graph of \( f \) is the graph of the equation \( y = f(x) \).
**Graphing**

**Coordinate Point**: $(x, y)$

**Coordinate Plane**: where you graph a coordinate

**X-axis**: the line that goes horizontally

**Y-axis**: the line that goes vertically

**Origin**: the center of the graph $(0, 0)$, starting point

**Quadrant**: 4 parts to the graph

**Graphing Notes**

1. Make sure you start at $(0,0)$
2. Make sure you go $\leftarrow$ first
3. Make sure you go $\uparrow$ second
EXAMPLE 1

(-3, 0)

EXAMPLE 2

(0, 2)

EXAMPLE 3

(-1, -3)
Connect each sequence of points with a line.

(-3,0) , (-4,-1) , (-6,-2) , (-6,-3) , (-5,-4) , (-4,-4) , (-3,-4) , (1,-2) End of Sequence
(-1,1) , (5,3) , (6,5) , (7,5) , (7,3) , (9,2) , (8,1.5) , (6,2) , (2,-5) End of Sequence
(-5,-3) , (-5.5,0) , (-5,0) , (-5,-6) , (-4.5,-6) , (-5,-3) End of Sequence
(-9,3) , (-7,4) , (7,-3) , (5,-4) , (-9,3) End of Sequence
(-6,-2) , (-4,-3) , (-2,-2) , (-1,-1) End of Sequence
(5,3) , (4,4) , (4.5,4.5) , (5.5,4) End of Sequence
(-4,-1) , (-2,-2) End of Sequence

What is the shape? ____________________
Connect each sequence of points with a line.

(-3,0) , (-4,-1) , (-6,-2) , (-6,-3) , (-5,-4) , (-4,-4) , (-3,-4) , (1,-2) End of Sequence
(-1,1) , (5,3) , (6,5) , (7,5) , (7,3) , (9,2) , (8,1.5) , (6,2) , (2,-.5) End of Sequence
(-5,-3) , (-5,5.0) , (5,0) , (-5,-6) , (-4.5,-6) , (-5,-3) End of Sequence
(-9,3) , (-7,4) , (7,-3) , (5,-4) , (-9,3) End of Sequence
(-6,-2) , (-4,-3) , (-2,-2) , (-1,-1) End of Sequence
(5,3) , (4,4) , (4.5,4.5) , (5.5,4) End of Sequence
(-4,-1) , (-2,-2) End of Sequence

What is the shape?    Airplane
<table>
<thead>
<tr>
<th>Level 1</th>
<th>Batman Symbol</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holding the paper horizontally, plot each point on the axes and connect them in order.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0, -12)</td>
<td>(13, 7)</td>
<td>(-17, -9)</td>
</tr>
<tr>
<td>(4, -6)</td>
<td>(12, 5)</td>
<td>(-14, -11)</td>
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<tr>
<td>(5, -5)</td>
<td>(11, 4)</td>
<td>(-11, -12)</td>
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<tr>
<td>(7, -6)</td>
<td>(6, 3)</td>
<td>(-13, -9)</td>
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<tr>
<td>(8, -8)</td>
<td>(3, 4)</td>
<td>(-13, -8)</td>
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<td>(9, -6)</td>
<td>(3, 12)</td>
<td>(-12, -6)</td>
</tr>
<tr>
<td>(10, -5)</td>
<td>(1, 9)</td>
<td>(-11, -5)</td>
</tr>
<tr>
<td>(11, -5)</td>
<td>(-1, 9)</td>
<td>(-10, -5)</td>
</tr>
<tr>
<td>(12, -6)</td>
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<td>(13, -8)</td>
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<tr>
<td>(12, -11)</td>
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<tr>
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<tr>
<td>(21, 1)</td>
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<tr>
<td>(20, 4)</td>
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<tr>
<td>(19, 6)</td>
<td>(-19, 6)</td>
<td></td>
</tr>
<tr>
<td>(17, 8)</td>
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<tr>
<td>(14, 10)</td>
<td>(-21, 1)</td>
<td></td>
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<tr>
<td>(11, 11)</td>
<td>(-21, -2)</td>
<td></td>
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<tr>
<td>(12, 10)</td>
<td>(-20, -5)</td>
<td></td>
</tr>
<tr>
<td>(13, 8)</td>
<td>(-19, -7)</td>
<td></td>
</tr>
</tbody>
</table>
Holding the paper vertically, plot each point on the axes and connect them in order. Do not connect the shapes to each other.

<table>
<thead>
<tr>
<th>Shape 1</th>
<th>Shape 2</th>
<th>Shape 3</th>
<th>Shape 4</th>
<th>Shape 5</th>
<th>Shape 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-5, -4)</td>
<td>(-3, 9)</td>
<td>(6, -9)</td>
<td>(8, 1)</td>
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<td>(-4, -6)</td>
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<td>(-1, -9)</td>
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<td>(0, -5)</td>
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<td>(9, 3)</td>
<td>(9, 3)</td>
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<td>(10, 2)</td>
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<tr>
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<td>(2, -7)</td>
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<tr>
<td>(-5, 10)</td>
<td></td>
<td>(0, 12)</td>
<td></td>
<td>(2, 10)</td>
</tr>
<tr>
<td>(-4, 9)</td>
<td></td>
<td>(-7, 6)</td>
<td></td>
<td>(7, 1)</td>
</tr>
<tr>
<td>(-3, 9)</td>
<td></td>
<td>(-6, 7)</td>
<td></td>
<td>(4, 10)</td>
</tr>
<tr>
<td>(-2, 10)</td>
<td></td>
<td>(-6, 5)</td>
<td></td>
<td>(-2, 5)</td>
</tr>
<tr>
<td>(0, 10)</td>
<td></td>
<td>(-3, 9)</td>
<td></td>
<td>(2, 5)</td>
</tr>
<tr>
<td>(1, 8)</td>
<td></td>
<td>(1, 10)</td>
<td></td>
<td>(0, 7)</td>
</tr>
<tr>
<td>(0, 7)</td>
<td></td>
<td>(4, 8)</td>
<td></td>
<td>(0, -7)</td>
</tr>
<tr>
<td>(-5, 7)</td>
<td></td>
<td>(-5, 7)</td>
<td></td>
<td>(-1, 9)</td>
</tr>
<tr>
<td>(-9, 11)</td>
<td></td>
<td>(-5, 5)</td>
<td></td>
<td>(-3, -9)</td>
</tr>
<tr>
<td>(-10, 13)</td>
<td></td>
<td>(-4, 7)</td>
<td></td>
<td>(3, 14)</td>
</tr>
<tr>
<td>(-11, 13)</td>
<td></td>
<td>(-10, 9)</td>
<td></td>
<td>(2, 12)</td>
</tr>
<tr>
<td>(-11, 11)</td>
<td></td>
<td>(-12, 8)</td>
<td></td>
<td>(3, 11)</td>
</tr>
<tr>
<td>(-14, 10)</td>
<td></td>
<td>(-4, 4)</td>
<td></td>
<td>(11, 11)</td>
</tr>
<tr>
<td>(-15, 8)</td>
<td></td>
<td>(-7, 6)</td>
<td></td>
<td>(2, 8)</td>
</tr>
<tr>
<td>(-15, 7)</td>
<td></td>
<td>(-3, 6)</td>
<td></td>
<td>(-5, 10)</td>
</tr>
<tr>
<td>(-15, 6)</td>
<td></td>
<td>(-3, 4)</td>
<td></td>
<td>(2, -8)</td>
</tr>
<tr>
<td>(-12, 6)</td>
<td></td>
<td>(-6, -8)</td>
<td></td>
<td>(4, -5)</td>
</tr>
<tr>
<td>(0, 14)</td>
<td></td>
<td>(0, 13)</td>
<td></td>
<td>(5, 12)</td>
</tr>
<tr>
<td>(1, 14)</td>
<td></td>
<td>(-1, 13)</td>
<td></td>
<td>(-3, 4)</td>
</tr>
<tr>
<td>(0, 14)</td>
<td></td>
<td>(-1, 13)</td>
<td></td>
<td>(-6, -8)</td>
</tr>
<tr>
<td>(1, 14)</td>
<td></td>
<td>(0, 13)</td>
<td></td>
<td>(-4, -8)</td>
</tr>
</tbody>
</table>

For shapes 38 and 39, make a large point for each.
Graphing Linear Equations

- **Slope** - \( \frac{\text{rise}}{\text{run}} \)

- **y-intercept** - where the line crosses the y-axis

- **x-intercept** - where the line crosses the x-axis

- **Slope-intercept form** - \( y = mx + b \)
  - ex: \( y = \frac{-3}{2}x + 8 \)

- **Standard form** - \( x \) and \( y \) on the same side
  - ex: \( 3x + 2y = 6 \)

- **Linear equation** - creates a straight line

**Graphing Steps**
1. Plot y-intercept
2. Use slope to get another point
3. Draw line through the points
EXAMPLE 1

\[ y = \frac{1}{2}x - 2 \]

slope: \( \frac{\text{up} 1}{\text{right} 2} \)

EXAMPLE 2

\[ y = \frac{-2}{3}x + 4 \]

slope: \( \frac{\text{down} 2}{\text{right} 3} \)

EXAMPLE 3

\[ y = 2x + 0 \]

slope: \( \frac{2}{1} = \frac{\text{up} 2}{\text{right} 1} \)
Sketch the graph of each line.

1) \( y = \frac{1}{4}x - 1 \)

2) \( y = -x + 2 \)

3) \( y = x + 1 \)

4) \( y = \frac{4}{3}x - 4 \)

5) \( y = -3x - 3 \)

6) \( y = 4 \)
11) $y = \frac{3}{5}x - 1$

12) $x = 5$

13) $y = 3$

14) $y = 3x - 2$

15) $y = 4x + 3$

16) $y = \frac{6}{5}x + 5$
Write the slope-intercept form of the equation of each line.

1) 

2) 

3) 

4) 

5) 

6) 

7) 

8)
Sketch the graph of each line.

1) $7x + y = 5$

2) $3x + 5y = -5$

3) $y = 4$

4) $6x + 5y = 20$

5) $x = -3$

6) $2x + y = 4$
7) $x + y = 3$

8) $10x - 3y = 15$

9) $x - y = 3$

10) $y = 0$

11) $x + y = -3$

12) $x + y = -1$
Input: what goes "in"

Output: what goes "out"

Domain: all the x values

Range: all the y values

1) Figure out which is x and which is y

2) list/write correctly (alphabetically or numerically)
Example 1: Mapping

Input: Jane, John, Sam
Output:
- Jane to 6
- John to 5
- Sam

Domain (D): \{Jane, John, Sam\}
Range (R): \{5, 6\}

Example 2: Graph 1

Domain (D): \{-3 \leq x \leq 3\}
Range (R): \{-3 \leq y \leq 3\}

Example 3: Graph 2

Domain (D): \{-\infty \leq x \leq \infty\}
Range (R): \{-\infty \leq x \leq \infty\}
### Domain and Range From a Table

Write the domain and range for each table given.

1. | $x$ | $y$ |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>6</td>
</tr>
<tr>
<td>-2</td>
<td>0</td>
</tr>
<tr>
<td>-1</td>
<td>-4</td>
</tr>
<tr>
<td>0</td>
<td>-6</td>
</tr>
<tr>
<td>1</td>
<td>-6</td>
</tr>
<tr>
<td>2</td>
<td>-4</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

2. | Kind of flower | Number of flowers |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rose</td>
<td>1</td>
</tr>
<tr>
<td>Tulip</td>
<td>5</td>
</tr>
<tr>
<td>Lily</td>
<td>5</td>
</tr>
<tr>
<td>Orchid</td>
<td>4</td>
</tr>
<tr>
<td>Forget-me-not</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>

3. **Temperatures in NY City**

<table>
<thead>
<tr>
<th>Day</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>52</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>5</td>
<td>59</td>
</tr>
<tr>
<td>6</td>
<td>67</td>
</tr>
</tbody>
</table>

4. | $x$ |  0 |  1 |  2 |  3 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

5. | Input, $i$ | Output, $C$ |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
</tr>
</tbody>
</table>

6. | $x$ | $y$ |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>5</td>
</tr>
<tr>
<td>-1</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>
7. Table #2

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>10</td>
<td>13</td>
<td>18</td>
<td>21</td>
<td>26</td>
<td>29</td>
<td>34</td>
</tr>
</tbody>
</table>

8. X- (input)  Y- (output)

9. FAVORITE FOOTWEAR

<table>
<thead>
<tr>
<th>Footwear</th>
<th>Boots</th>
<th>Flip-Flops</th>
<th>Sandals</th>
<th>Sneakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Votes</td>
<td>3</td>
<td>8</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

10. Data Table C: Trout Creek Rainfall 1980-1989

<table>
<thead>
<tr>
<th>Year</th>
<th>Rainfall (in inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>24.7</td>
</tr>
<tr>
<td>1981</td>
<td>21.2</td>
</tr>
<tr>
<td>1982</td>
<td>14.5</td>
</tr>
<tr>
<td>1983</td>
<td>13.2</td>
</tr>
<tr>
<td>1984</td>
<td>12.1</td>
</tr>
<tr>
<td>1985</td>
<td>18.8</td>
</tr>
<tr>
<td>1986</td>
<td>19.0</td>
</tr>
<tr>
<td>1987</td>
<td>29.2</td>
</tr>
<tr>
<td>1988</td>
<td>31.6</td>
</tr>
<tr>
<td>1989</td>
<td>21.0</td>
</tr>
</tbody>
</table>

11. X- (input)  Y- (output)

12. Table #3

<table>
<thead>
<tr>
<th>x</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>1</td>
<td>6</td>
<td>11</td>
<td>16</td>
<td>21</td>
<td>26</td>
<td>31</td>
</tr>
</tbody>
</table>
Domain and Range From a Graph

Write the domain and range for each graph given.

1.

2.

3.

4.

5.

6.
GRAPHING.

1. \( y = -3x + 4 \)  
2. \( y = 2x - 7 \)  
3. \( y = 4 - 3x \)  

SOLVING EQUATIONS.

1. \( 5(x + 2) = 25 \)  
2. \( 2(2x + 10) = 40 \)  
3. \( 5x + 1 = 31 \)  
4. \( 7x = 60 + 2x \)  
5. \( 3x = 72 - 3x \)
EVALUATING.
1. $6q + m - m$; use $m = 8$ and $q = 3$

2. $x - y + 6$; use $x = 6$ and $y = 1$

3. $(5 - z)(x + 3) - x$; use $x = 6$ and $z = 3$

By L. Church and A. Sanfillippo

DESCRIBING DOMAIN AND RANGE.

By L. Church and A. Sanfillippo
GRAPHING COORDINATES.

Using a piece of graph paper and lined paper...

1. Create a picture or character on the graph paper
   *Note: It must have a minimum of 10 points!*

2. List the coordinates needed to make the picture
   or character on the lined paper

By L. Church and A. Sanfillippo
ALGEBRAIC EXPRESSION

Combine like terms

INVERSE OPERATIONS

x-values, what you put in

COEFFICIENT

Everything that could be x

Example:

\[ y = \frac{1}{2} x - 4 \]
<table>
<thead>
<tr>
<th><strong>Y-INTERCEPT</strong></th>
<th>Get the variable, $x$, by itself</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOMAIN</strong></td>
<td>The center of the graph</td>
</tr>
<tr>
<td></td>
<td>The starting point</td>
</tr>
<tr>
<td><strong>SLOPE-INTERCEPT FORM</strong></td>
<td>y-values, what comes out</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>$4x + 1 + 2y + 2x + 5 = 6x + 2y + 6$</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>$D: { -3 \leq x \leq 5 }$</td>
</tr>
<tr>
<td>ISOLATE THE VARIABLE</td>
<td>$y = mx + b$</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ORIGIN</td>
<td>The line that goes horizontally</td>
</tr>
<tr>
<td>COORDINATE PLANE</td>
<td>Has letters, numbers, and operations ($+ , - , \cdot , \div$)</td>
</tr>
</tbody>
</table>
**LINEAR EQUATION**

Letter that stands for a number

**OUTPUT**

Do the operation that is opposite

**EVALUATE**

Where you graph a coordinate

Example:

\[ x - 4 = 28 \]

\[ x = 32 \]
<table>
<thead>
<tr>
<th>DISTRIBUTIVE PROPERTY</th>
<th>Creates a straight line</th>
<th>Example: 1x + 3y = 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMPLIFY</td>
<td>The line that goes vertically</td>
<td>6x + 2y</td>
</tr>
<tr>
<td>X-AXIS</td>
<td>Contains variables, numbers, operations (+, -, ∙, ÷), and an equal sign</td>
<td><img src="image" alt="Graph" /></td>
</tr>
</tbody>
</table>
ALGEBRAIC EQUATION

SLOPE \( \frac{\text{rise}}{\text{run}} \)

Example: \( 2x + 6 = 16 \)

RANGE

Everything that could be \( y \)

(0,0)
| **STANDARD FORM** | Where line crosses the y-axis | **Example:**  
|  |  | \(3x-2y, \ x=2\ \text{and} \ y=1\)  
|  |  | \(3(2)-2(1)=4\)  
| **VARIABLE** | Number in front of the variable |  
|  |  |  
| **QUADRANT** | Outside times inside |  
|  |  | \(+ \leftrightarrow -\)  
|  |  | \(\cdot \leftrightarrow \div\)  
|  |  |  

<table>
<thead>
<tr>
<th><strong>X-INTERCEPT</strong></th>
<th><strong>Point</strong> $(x, y)$</th>
<th>Example: $\begin{align*} 2(2x+1) &amp; = 4x+2 \end{align*}$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Y-AXIS</strong></td>
<td>Where line crosses the x-axis</td>
<td>$y = mx + b$</td>
</tr>
<tr>
<td><strong>INPUT</strong></td>
<td>Get an answer (Substitution)</td>
<td>Example: $R:{2,4,8,9}$</td>
</tr>
<tr>
<td>COORDINATE</td>
<td>When all the variables are on the same side of the equal sign</td>
<td>Example: $2x+6$</td>
</tr>
</tbody>
</table>
Week 3
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 9/18/2017

Unit 1: Pre-Assessment and Review (Functions, Linear Functions, Exponents)

Target Skills

Day 1/2 Skill: Identify Domain and Range

Day 3/4 Skill: Ordered Pairs, Relation, Function, Vertical line test
<table>
<thead>
<tr>
<th></th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WARM-UP</strong></td>
<td>Type II: Given graph, tell us the domain and range</td>
<td>Type II: Given graph’s domain and range, draw the graph</td>
<td>Type II: Tell us about functions in 3 sentences</td>
<td>Type II: Is this a function? Why or why not?</td>
<td>Type I: Best invention ever (3 sentences)</td>
</tr>
<tr>
<td><strong>(5 minutes)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NOTES</strong></td>
<td>Reiterate: Domain and Range</td>
<td>None</td>
<td>Introduce: Ordered Pairs Relation Function Vertical line test (watching videos and taking own notes)</td>
<td>Formally introduce: Ordered Pairs Relation Function Vertical line test Powerpoint Presentation</td>
<td>None</td>
</tr>
<tr>
<td><strong>(8-10 minutes)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TASK 1</strong></td>
<td>Identify domain and range-10 examples as a group (10-15 minutes)</td>
<td>Review (Simplify, Sketch, Solve, Domain/Range) (10-12 minutes)</td>
<td>Pop machine—function exploration Task 1 (6 minutes)</td>
<td>Lesson 1-6 Practice A (10-15 minutes)</td>
<td>Card sort Domain/Range As assessment (10-15 minutes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TASK 2</strong></td>
<td>Identify domain and range-8 examples individually (10-15 minutes)</td>
<td>Domain and Range-Create graph worksheet (10-12 minutes)</td>
<td>Pop machine—function exploration Task 2 (8 minutes)</td>
<td>Lesson 1-6 Reading Strategies (10-15 minutes)</td>
<td>Create 4 function and 4 non-functions (one of each—graph, table,</td>
</tr>
<tr>
<td>TASK 3</td>
<td>4 Descriptions And Create graph (10-15 minutes)</td>
<td>30 second video—given chosen domain and range, create graph and explain it in a 30 second video (10-15 minutes)</td>
<td>Desmos—Function Carnival Part 2 (10-15 minutes)</td>
<td>Section 3.2 Function or Nonfunction Worksheet (10-15 minutes)</td>
<td>Chromebook activity (15-20 minutes)</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Quiz (6-10 minutes)</td>
<td>Get a graph and tell us the domain and range</td>
<td>None</td>
<td>None</td>
<td>4 questions—given orally (or written for particular students)</td>
<td>None</td>
</tr>
<tr>
<td>CLOSURE (2-4 minutes)</td>
<td>Sentence reflection on today’s lesson</td>
<td>Clean-Up</td>
<td>Clean up—Put Chrome Books away neatly and charging</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on the week</td>
</tr>
<tr>
<td>Materials</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
</tr>
<tr>
<td>Notes (gold sheet)</td>
<td>Notes (gold sheet)</td>
<td>Notes (gold sheet)</td>
<td>Quiz (tan sheet)</td>
<td>Domain and Range Card Sort</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-----------------</td>
<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td>Worksheets (3)</td>
<td>Quiz (tan sheet)</td>
<td>Homework (green sheet)</td>
<td>Pop Machine Activity</td>
<td>Chrome Books</td>
<td></td>
</tr>
<tr>
<td>Quiz (tan sheet)</td>
<td>Homework (green sheet)</td>
<td>Assessment (Part 2)</td>
<td>Chrome Books</td>
<td>Function vs Nonfunction Directions</td>
<td></td>
</tr>
<tr>
<td>Homework (green sheet)</td>
<td>Domain and Range Worksheet</td>
<td>Phone Camera</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Vocabulary**

- **domain**
- **range**
- **input**
- **output**

**I can...**

- I can define relation, domain and range.
- I can determine if a graph, table, or set of ordered pairs
- I can define relation, domain and range.
- I can determine if a graph, table, or set of ordered pairs

**Domain and Range**

- I can define relation, domain and range.
- I can determine if a graph, table, or set of ordered pairs
- I can determine if a graph, table, or set of ordered pairs
<table>
<thead>
<tr>
<th>I will...</th>
<th>represents a function. • I can define relation, domain and range.</th>
<th>• I can determine if a graph, table, or set of ordered pairs represents a function.</th>
<th>represents a function. • I can define relation, domain and range.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will be able to identify domain and range of a graph or table</td>
<td>I will learn about functions</td>
<td>I will learn about functions</td>
<td>I will be able to identify domain and range of a graph or table</td>
</tr>
</tbody>
</table>

| CC Standards | HSF-IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If \( f \) is a function and \( x \) is an element of its domain, then \( f(x) \) denotes the output of \( f \) corresponding to the input \( x \). The graph of \( f \) is the graph of the equation \( y = f(x) \) | HSF-IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If \( f \) is a function and \( x \) is an element of its domain, then \( f(x) \) denotes the output of \( f \) corresponding to the input \( x \). The graph of \( f \) is the graph of the equation \( y = f(x) \) | HSF-IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If \( f \) is a function and \( x \) is an element of its domain, then \( f(x) \) denotes the output of \( f \) corresponding to the input \( x \). The graph of \( f \) is the graph of the equation \( y = f(x) \) | HSF-IF.A.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If \( f \) is a function and \( x \) is an element of its domain, then \( f(x) \) denotes the output of \( f \) corresponding to the input \( x \). The graph of \( f \) is the graph of the equation \( y = f(x) \) |
Domain and Range Part 1
Write what the domain and range is of each graph.

1. [Graph of an ellipse]
2. [Graph of a hyperbola]
3. [Graph of a line]
4. [Graph of a set of points]
Domain and Range Part 2
Write what the domain and range is of each graph.

1. | x  | y  |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>3</td>
<td>6.8</td>
</tr>
<tr>
<td>4</td>
<td>13.6</td>
</tr>
<tr>
<td>5</td>
<td>27.2</td>
</tr>
</tbody>
</table>

2. | x  | y  |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-3</td>
</tr>
<tr>
<td>0</td>
<td>-3</td>
</tr>
<tr>
<td>-2</td>
<td>-3</td>
</tr>
<tr>
<td>6</td>
<td>-3</td>
</tr>
</tbody>
</table>

3. | x  | y  |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>-3</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

4. [Diagram of set mapping with elements -1, 1, 7, 5, 49, 25 mapping to elements 1, 49, 25, 7, respectively.]

5. [Diagram of set mapping with elements 2, 4, 5 mapping to elements 1, 2, 3, 4, 5, 6, 7, respectively.]
Domain and Range Part 3

Given the following domain and range descriptions, create a graph.

1. 

\[ D: (-\infty \leq x \leq \infty) \]
\[ R: (-\infty \leq x \leq \infty) \]

2. 

\[ D: (-5 \leq x \leq \infty) \]
\[ R: (-\infty \leq x \leq \infty) \]
3.

\[ D: (-\infty \leq x \leq \infty) \]
\[ R: (-\infty \leq x \leq 3) \]

4.

\[ D: (-7 \leq x \leq 5) \]
\[ R: (-2 \leq x \leq 6) \]

5.

\[ D: (-8, -6, 1, 4,) \]
\[ R: (-6, 0, 4) \]
Review:
Simplify, Sketch graph, Solve equations, Domain/range
Simplify each expression.

1) $1 + k + 6k$
2) $6x - 3x$

3) $7(n - 2)$
4) $-6(1 + 6v)$

5) $-6x + 3(1 + 3x)$
6) $-6r - 6(8r + 7)$

Sketch the graph of each line.

7) $y = 2x + 3$

8) $y = -x + 1$
9) \( y = x + 1 \)

10) \( y = -\frac{9}{5}x - 4 \)

Solve

11) \( 2x + 6 = -16 \)

12) \( 3(2x - 5) = 21 \)

13) \( 5x + 12 = 26 \)

14) \( 4(-2x + 6) = 72 \)

Tell us the domain and range of the graph.

15) \( \frac{(x - 1)^2}{36} + \frac{(y + 3)^2}{16} = 1 \)

16) \( y = |x + 1| + 3 \)
17) \[ y = -\frac{1}{3}x^2 + \frac{2}{3}x - \frac{13}{3} \]

18) \[ x = y^2 + 8y + 14 \]
30-Second Domain/Range Graph Video

You will be given a pair of domain and range descriptions.

**TASK:** Explain and demonstrate how to draw the graph given the description of the domain and range.

You will be videotaped for grading purposes, and your explanation should be 30-seconds long (give or take 5 seconds).

Be sure to rehearse your explanation for accuracy, clarity, and timing!
Can I Predict the Output?

Task 1: The Cola Machine

The Cola machine in Kalamazoo Central High School offers several types of pop. There are two buttons for Coca Cola, while the other drinks of Sprite, Powerade, Fanta, and Diet Coke each have one button.

1. Describe the input and output of the Kalamazoo Central High School Cola machine.

   Input: 

   Output:

2. While buying a pop, Mr. Johnson pushed the button for Sprite and got a can of Sprite. Later he went back to the same machine, but this time pushing the Sprite button got him a can of Coca Cola. Is the machine functioning consistently? Why or why not?

3. When Jamie pushed the top button for Coca Cola, she received a can of Coca Cola. Her friend, Kristen, decided to be different and pushed the second button for Coca Cola. She also received a can of Coca Cola. Is the machine functioning consistently? Why or why not?
4. When Susan pushed a button for Fanta, she received a can of Diet Coke. Later, Miguel also pushed the Fanta button and received a can of Diet Coke. Still later, Chris noticed that everyone who pushed the Fanta button received a Diet Coke. Is the machine functioning consistently? Explain why or why not?

Once you have completed Task 1 as a group, discuss what exactly it would mean for the pop machine to be functioning consistently. Write down what you feel is needed in order for the pop machine to be considered “functioning consistently”.
Task 2: Is it a function?

In a relationship like the pop machine, we want the outcome to be consistent and predictable. When it is, we say that the machine is “functioning consistently”.

Examine each of the tables below that show different inputs and their outputs. Decide if the table could be describing a candy machine that is “functioning consistently”. Explain your reasoning.

<table>
<thead>
<tr>
<th>Input: Button Number Pressed</th>
<th>1</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output: Type of Candy Received</td>
<td>Twix</td>
<td>Twix</td>
<td>M&amp;Ms</td>
<td>M&amp;Ms</td>
<td>Snickers</td>
<td>Snickers</td>
</tr>
</tbody>
</table>

Is this candy machine functioning consistently? Yes No

Explanation:

<table>
<thead>
<tr>
<th>Input: Button Number Pressed</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output: Type of Snack Received</td>
<td>Flamin’ Hot Cheetos</td>
<td>Nacho Doritos</td>
<td>Fritos</td>
<td>Lays Potato Chips</td>
<td>Flamin’ Hot Cheetos</td>
<td>Nacho Doritos</td>
</tr>
</tbody>
</table>

Is this snack machine functioning consistently? Yes No

Explanation:
Now, instead of the outputs being snacks and drinks, the outputs are numbers. You can still think about those machines, however, to help you decide if the following are functioning consistently or not.

<table>
<thead>
<tr>
<th>Input</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>7</td>
<td>0</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

Is this machine functioning consistently?  Yes  No

Explanation:

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>2</th>
<th>3</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Is this machine functioning consistently?  Yes  No

Explanation:

<table>
<thead>
<tr>
<th>Input</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Is this machine functioning consistently?  Yes  No

Explanation:

<table>
<thead>
<tr>
<th>Input</th>
<th>3</th>
<th>3</th>
<th>3</th>
<th>3</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Is this machine functioning consistently?  Yes  No

Explanation:
A relationship between inputs and outputs is called a **function** if the inputs and outputs behave like a pop machine that is functioning consistently. Discuss with your team what it means for a relationship between inputs and outputs to be a function.
1. Have students log into Chrome Books.
2. Go to https://teacher.desmos.com/activitybuilder/custom/56d7528a9e6961430932681e
3. Click on “Create Class Code”
4. Display class code and collect results.
Objectives

- Identify the domain and range of relations and functions.
- Determine whether a relation is a function.
Vocabulary

relation
domain
range
function
A **relation** is a pairing of input values with output values. It can be shown as a set of ordered pairs \((x, y)\), where \(x\) is an input and \(y\) is an output.

The set of input values for a relation is called the **domain**, and the set of output values is called the **range**.
Mapping Diagram

Set of Ordered Pairs

\{(2, A), (2, B), (2, C)\}

\((x, y) \rightarrow \text{(input, output)} \rightarrow \text{(domain, range)}\)
Example 1: Identifying Domain and Range

Give the domain and range for this relation: 
\{ (100,5), (120,5), (140,6), (160,6), (180,12) \}.

List the set of ordered pairs:
\{ (100, 5), (120, 5), (140, 6), (160, 6), (180, 12) \}

Domain: \{100, 120, 140, 160, 180\} \text{ The set of x-coordinates.}

Range: \{5, 6, 12\} \text{ The set of y-coordinates.}
Check It Out! Example 1

Give the domain and range for the relation shown in the graph.

List the set of ordered pairs:
\{(-2, 2), (-1, 1), (0, 0), (1, -1), (2, -2), (3, -3)\}

Domain: \{-2, -1, 0, 1, 2, 3\}  \text{The set of x-coordinates.}
Range: \{-3, -2, -1, 0, 1, 2\} \text{The set of y-coordinates.}
**Not a function:** The relationship from number to letter is *not* a function because the domain value 2 is mapped to the range values A, B, and C.

**Function:** The relationship from letter to number is a function because each letter in the domain is mapped to only one number in the range.
Example 2: Determining Whether a Relation is a Function

Determine whether each relation is a function.

from types of fruits to their colors

A fruit, such as an apple, from the domain would be associated with more than one color, such as red and green. The relation from types of fruits to their colors is not a function.
Check It Out! Example 2

Determine whether each relation is a function.

A. There is only one price for each shoe size. The relation from shoe sizes to price makes is a function.

<table>
<thead>
<tr>
<th>Shoe Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
</tr>
<tr>
<td>Price ($)</td>
</tr>
</tbody>
</table>
Every point on a vertical line has the same $x$-coordinate, so a vertical line cannot represent a function. If a vertical line passes through more than one point on the graph of a relation, the relation must have more than one point with the same $x$-coordinate. Therefore the relation is not a function.
1-6 Relations and Functions

**Vertical-Line Test**

<table>
<thead>
<tr>
<th>WORDS</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>If any vertical line passes through more than one point on the graph of a relation, the relation is not a function.</td>
<td><img src="image1" alt="Function" /></td>
</tr>
</tbody>
</table>

- **Function**
- **Not a Function**
Example 3A: Using the Vertical-Line Test

Use the vertical-line test to determine whether the relation is a function. If not, identify two points a vertical line would pass through.

This is a function. Any vertical line would pass through only one point on the graph.
Example 3B: Using the Vertical-Line Test

Use the vertical-line test to determine whether the relation is a function. If not, identify two points a vertical line would pass through.

This is not a function. A vertical line at $x = 1$ would pass through $(1, 1)$ and $(1, -2)$. 
Check It Out! Example 3a

Use the vertical-line test to determine whether the relation is a function. If not, identify two points a vertical line would pass through.

This *is* a function. Any vertical line would pass through only one point on the graph.
Check It Out! Example 3a

Use the vertical-line test to determine whether the relation is a function. If not, identify two points a vertical line would pass through.

This is *not* a function. A vertical line at $x = 1$ would pass through $(1, 2)$ and $(1, -2)$. 
Complete each sentence to make a true statement.

1. The domain of a relation corresponds to the ________-values in the ordered pairs.
2. The range of a relation corresponds to the ________-values in the ordered pairs.

Give the domain and range for each relation.

3.  

<table>
<thead>
<tr>
<th>Day</th>
<th>CDs Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>287</td>
</tr>
<tr>
<td>Tue</td>
<td>395</td>
</tr>
<tr>
<td>Wed</td>
<td>128</td>
</tr>
<tr>
<td>Thu</td>
<td>326</td>
</tr>
<tr>
<td>Fri</td>
<td>649</td>
</tr>
</tbody>
</table>

Determine whether each relation is a function. Write yes or no.

5. {(2, 3), (5, 4), (0, 3), (4, 1)}
6. ________________________

Determine whether each relation is a function. Write yes or no. Use the vertical-line test.

7. ________________________
8. ________________________
9. ________________________
A function is a relation in which the input is never repeated. A relation is a pairing of 2 sets of numbers, such as pairing a year with the number of students enrolled in school. Use a table to help you determine if a relation is a function.

### Lakeside School Enrollment

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>356</td>
</tr>
<tr>
<td>2001</td>
<td>372</td>
</tr>
<tr>
<td>2002</td>
<td>422</td>
</tr>
<tr>
<td>2003</td>
<td>455</td>
</tr>
</tbody>
</table>

The **domain** is the set of input values. The domain is the \( x \) values.

The **range** is the set of output values. The range is the \( y \) values.

Because no input values are repeated, the relation is a function.

<table>
<thead>
<tr>
<th>( x )</th>
<th>(-10)</th>
<th>(-5)</th>
<th>(-1)</th>
<th>(-1)</th>
<th>(0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

\(-1\) is an input value. It is repeated. The relation is not a function.

### Use the table for Exercises 1–3.

<table>
<thead>
<tr>
<th>( x )</th>
<th>(-2)</th>
<th>(-2)</th>
<th>(0)</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>4</td>
<td>2</td>
<td>(0)</td>
<td>(-4)</td>
<td>(-6)</td>
</tr>
</tbody>
</table>

1. What is the domain of the relation? How do you know?

_________________________________________________________________________________________

2. What is the range of the relation? How do you know?

_________________________________________________________________________________________

3. Is the relation a function? Explain.

_________________________________________________________________________________________

4. Make a table to show the ordered pairs in the set. Is the relation a function? Explain.
   
   \{(9, 6), (1, 4), (0, 2), (1, 4), (4, 6)\}

_________________________________________________________________________________________
Determine if the following are functions... Write “function” or “not function” on the line.

\[
\begin{array}{cccc}
X & 1 & 2 & 3 & 4 \\
Y & 4 & -2 & 5 & -3 \\
\end{array}
\quad
\begin{array}{cccc}
X & 0 & 8 & -2 & 6 \\
Y & 7 & -2 & 8 & 1 \\
\end{array}
\quad
\begin{array}{cccc}
X & 4 & 3 & 4 & 6 \\
Y & 6 & -1 & 2 & 6 \\
\end{array}
\]

\[
\{ (6, 1), (4, 2), (6, -3), (2, 5) \} 
\quad
\{ (5, 8), (3, -2), (-2, -5), (0, 0) \}
\]

Determine if the following sets are functions:

\[
\begin{array}{c}
\begin{array}{ccc}
-2 & 2 & -4 \\
1 & -4 & 1 \\
5 & -3 & 2 \\
-3 & \text{function} & \text{not function} \\
\end{array}
\end{array}
\quad
\begin{array}{c}
\begin{array}{ccc}
5 & -4 & 1 \\
-3 & \text{function} & \text{not function} \\
1 & -2 & \text{function} \\
\end{array}
\end{array}
\]
\{ (2, 4), (2, 5), (2, 6), (2, 7) \}

\{ (0, 0), (3, -1), (-5, -5), (4, 0) \}

\begin{tabular}{|c|c|c|c|}
\hline
X & 3 & 3 & 3 & 3 \\
\hline
Y & 5 & -2 & 1 & -3 \\
\hline
\end{tabular}

\begin{tabular}{|c|c|c|c|}
\hline
X & 0 & 4 & 7 & 6 \\
\hline
Y & 1 & 1 & 1 & 1 \\
\hline
\end{tabular}

\begin{tabular}{|c|c|c|c|}
\hline
X & 2 & 5 & 8 & 1 \\
\hline
Y & -8 & 3 & 2 & 3 \\
\hline
\end{tabular}

\{ (5, 5), (4, 4), (3, 3), (2, 2) \}

\{ (0, 2), (0, 4), (0, 6), (0, 8) \}
D: $(-\infty \leq X \leq \infty)$
R: $(-6.5 \leq Y \leq \infty)$

D: $(1, 2, 3)$
R: $(c, d)$

D: $(-4, -1, 0, 2, 3)$
R: $(1, 2, 3)$

D: $(-\infty \leq X \leq \infty)$
R: $(-6.5 \leq Y \leq 5)$

D: $(-2 \leq X \leq 6)$
R: $(-4 \leq Y \leq 2)$

D: $(0 \leq X \leq \infty)$
R: $(20 \leq Y \leq \infty)$

D: $(-2, 0, 2, 5)$
R: $(0, 1, 2, 4)$

D: $(-1 \leq X \leq 5)$
R: $(-3 \leq Y \leq 3)$

D: $(-\infty \leq X \leq \infty)$
R: $(-6 \leq Y \leq \infty)$

D: $(-3, -2, -1, 0, 1, 2, 3, 4)$
R: $(-6, -4, 0, 6)$

D: $(-\infty \leq X \leq \infty)$
R: $(-6 \leq Y \leq \infty)$

D: $( -2 , -1 , 0 )$
R: $( -2 , 0 , 2 )$
Chrome Book Activity

Functions and Not Functions

You need to make a Google document with 2 pages.

Page 1: Titled “Functions”

Page 2: Titled “Not Functions”

Requirements:

• Find examples of functions and nonfunctions by searching the internet for images.
  o Copy the images and paste them to the “Functions” page or the “Not Functions” page.
• You must have 12 examples of Functions.
  o 3 examples of tables
  o 3 examples of graphs
  o 3 examples of ordered pairs
  o 3 examples of mappings
• You must have 12 examples of Not Functions.
  o 3 examples of tables
  o 3 examples of graphs
  o 3 examples of ordered pairs
  o 3 examples of mappings
Week 4
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 9/25/17

Unit 1: Pre-Assessment and Review (Functions, Linear Functions, Exponents)

Target Skills

Day 1/2 Skill: Function Notation

Day 3/4 Skill: What to do when it says to add or subtract functions
<table>
<thead>
<tr>
<th></th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARM-UP</td>
<td>Type II: (Given a graph) Is this a function? Why or why not?</td>
<td>Type II: (Given a table) Is this a function? Why or why not?</td>
<td>Type I: Describe function notation</td>
<td>Type II: Find f(x) - g(x)</td>
<td>Type II: Find x if given f(x)</td>
</tr>
<tr>
<td>(5 minutes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOTES</td>
<td>None</td>
<td>Function Notation</td>
<td>What to do when it says to add or subtract functions</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>(8-10 minutes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TASK 1</td>
<td>Finish Assessment from Friday (Chromebook Activity-Functions and Nonfunctions) (35 minutes)</td>
<td>Reading Strategies 1-7 (10-12 minutes)</td>
<td>30 Problems (20 minutes) Guided if needed</td>
<td>Assessment—Create a children’s book about function notation (Day 1 of 2)</td>
<td>Assessment—Create a children’s book about function notation (Day 2 of 2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TASK 2</td>
<td>Desmos Activity-domain and range (12-15 minutes)</td>
<td>Practice A 1-7 (10-12 minutes)</td>
<td>20 Problems (10-15 minutes) Select groups of students to share work on board</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TASK 3</td>
<td>None</td>
<td>Evaluating functions</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>worksheet (10-15 minutes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td><strong>Quiz</strong> (6-10 minutes)</td>
<td>None</td>
<td>2 Questions (one of each from worksheet 2)</td>
<td>1 Question on adding functions</td>
<td>None</td>
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<td><strong>CLOSEURE</strong> (2-4 minutes)</td>
<td>Clean Up</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on today’s lesson</td>
<td>Clean Up</td>
<td>Clean Up</td>
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<tr>
<td><strong>HOMEWORK</strong></td>
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<td>Standard summary+ Create 2 problems</td>
<td>Standard summary+ Create 2 problems</td>
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<td><strong>Materials</strong></td>
<td>• Warm-Up (pink sheet) • Chrome Books • Chromebook Activity worksheet</td>
<td>• Warm-Up (pink sheet) • Notes (gold sheet) • Quiz (tan sheet) • Homework (green sheet) • Evaluating functions worksheet</td>
<td>• Warm-Up (pink sheet) • Notes (gold sheet) • Quiz (tan sheet) • Homework (green sheet) • Adding and Subtracting functions worksheet</td>
<td>• Warm-Up (pink sheet) • Directions sheet for children’s book • Chrome Books • Blank Paper • Coloring utensils • Calculators</td>
<td>• Warm-Up (pink sheet) • Directions sheet for children’s book • Chrome Books • Blank Paper • Coloring utensils • Calculators</td>
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<tr>
<td>Vocabulary</td>
<td>Practice A 1-7</td>
<td>Evaluating with adding and subtracting functions worksheet</td>
<td>Calculators</td>
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<td>function notation</td>
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I can... (from pacing guide)
- I can define relation, domain and range.
- I can determine if a graph, table, or set of ordered pairs represents a function.
- I can determine if a graph, table, or set of ordered pairs represents a function.
- I can determine if a graph, table, or set of ordered pairs represents a function.
- I can determine if a graph, table, or set of ordered pairs represents a function.

I will... (posted on board)
- I will be able to find domain and range and identify functions.
- I will be able to use function notation.
- I will be able to use function notation.
- I will be able to use function notation.
- I will be able to use function notation.

CC Standards
- **HSF-IF.A.1:** Understand that a function from one set (called the domain) to another set (called the range).
- **HSF-IF.A.1:** Understand that a function from one set (called the domain) to another set (called the range).
- **HSF-IF.A.1:** Understand that a function from one set (called the domain) to another set (called the range).
- **HSF-IF.A.1:** Understand that a function from one set (called the domain) to another set (called the range).
range) assigns to each element of the domain exactly one element of the range. If $f$ is a function and $x$ is an element of its domain, then $f(x)$ denotes the output of $f$ corresponding to the input $x$. The graph of $f$ is the graph of the equation $y = f(x)$.

HSF-IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
1. Have students log into Chrome Books.
2. Go to https://teacher.desmos.com/activitybuilder/custom/56e8442cc2a23ba41da1c7d9
3. Click on “Create Class Code”
4. Display class code and collect results.
Function Notation: new way to write the relationship between input, $x$, and output, $y$

Example:

\[ y = f(x) \]

\[ f(x) = 3x + 2 \]

$f(x)$ means "f at $x$" or "f of $x$"

Note: Sometimes we use $g(x)$, $h(x)$, or $k(x)$ rather than $f(x)$. But it all means function notation.

Example: $f(-3)$ means "f at $x=-3$"

\[ f(x) = 3x + 2 \]
\[ f(-3) = 3(-3) + 2 \]
\[ f(-3) = -9 + 2 \]

Answer: $f(-3) = -7$
EXAMPLE 1

\[ f(x) = 2x - 2; \quad \text{Find } f(3) \]

\[ f(3) = 2(3) - 2 \]
\[ f(3) = 6 - 2 \]
\[ f(3) = 4 \]

EXAMPLE 2

\[ f(x) = x^2 + 2x - 4; \quad \text{Find } f(4) \]

\[ f(4) = (4)^2 + 2(4) - 4 \]
\[ f(4) = 16 + 8 - 4 \]
\[ f(4) = 20 \]

EXAMPLE 3

\[ f(x) = 4x - 5 \]
\[ f(x) = 23 \]

\[ 4x - 5 = 23 \]
\[ +5 \quad +5 \]

\[ 4x = 28 \]
\[ \frac{4x}{4} = \frac{28}{4} \]
\[ x = 7 \]
Function notation, \( f(x) \), allows you to keep track of the dependent variable. The dependent variable is \( x \).

In function notation, \( y = f(x) \).

To evaluate \( f(x) = x^2 + 2x - 1 \) for \( f(3) \), substitute 3 for \( x \) in the function.

\[
f(3) = (3)^2 + 2(3) - 1 = 9 + 6 - 1 = 14
\]

For \( y = f(x) \), when \( x = 3 \), \( y = 14 \).

You can graph \( y = f(x) \). Use the graph to evaluate \( f(-2) \): find the point on the graph where \( x = -2 \).

\[
f(-2) = 4
\]

Answer each question.

1. Use function notation to write: “\( f \) of \( x \) is equal to \( x \) cubed minus \( x \) squared.”

2. Describe the function in words: \( f(x) = 5x^2 + 4x - 3 \).

3. Explain how to evaluate \( f(x) = x^3 + 6x \) for \( f(-1) \).

4. Explain how to use the graph to evaluate \( f(2) \).
**Practice A**

**Function Notation**

Find each value of the function.

1. \( f(x) = -5x + 9 \)
   \[ f(3) = -5(3) + 9 = \ldots + 9 = \ldots \]

2. \( f(0) = \ldots \)
3. \( f(-1) = \ldots \)
4. \( f(-4) = \ldots \)
5. \( f(1) = \ldots \)
6. \( f(-2) = \ldots \)
7. \( f(0) = \ldots \)
8. \( f(2) = \ldots \)

Graph each function.

5. \[ \begin{array}{c|c|c}
-2 & 0 & 2 \\
-1 & 1 & 3 \\
\end{array} \]
6. \( f(x) = 2x - 3 \)

7. Ty uses the function \( g(x) = 0.5 + 0.2(x - 1) \) to calculate the cost in dollars of using a calling card to make a long-distance call lasting \( x \) minutes. The variable \( x \) must be a whole number. Graph the function. Then determine the cost of a 10-minute call.
Evaluate each function.

1) \(g(x) = 2x + 3\); Find \(g(-9)\)

2) \(p(x) = 4x + 1\); Find \(p(-7)\)

3) \(g(a) = 4a - 2\); Find \(g(-10)\)

4) \(g(x) = 3x + 1\); Find \(g(7)\)

5) \(k(a) = 3a - 4\); Find \(k(-9)\)

6) \(w(n) = 2n - 3\); Find \(w(-5)\)

7) \(g(x) = -4x + 5\); Find \(g(8)\)

8) \(w(n) = -2n + 4\); Find \(w(0)\)

9) \(k(a) = 4a - 3\); Find \(k(8)\)

10) \(f(x) = 3x + 4\); Find \(f(-9)\)

11) \(g(x) = x^2 - 2x\); Find \(g(-2)\)

12) \(f(t) = t^2 + 5t\); Find \(f(-10)\)

13) \(f(n) = -2n^2 - 6n\); Find \(f(-6)\)

14) \(w(n) = n^2 - 2n\); Find \(w(1)\)

15) \(h(a) = a^2 + 3\); Find \(h(5)\)

16) \(f(t) = t^3 - 5\); Find \(f(3)\)

17) \(p(t) = 3t^2 + 6t\); Find \(p(2)\)

18) \(g(t) = t^3 + 2t^2\); Find \(g(-6)\)

19) \(f(t) = t^2 + 3\); Find \(f(6)\)

20) \(p(a) = a^2 + a\); Find \(p(2)\)

21) \(k(a) = 4a - 3\); Find \(k(-2a)\)

22) \(p(a) = -a + 2\); Find \(p\left(\frac{x}{2}\right)\)

23) \(p(x) = x - 3\); Find \(p(-3x)\)

24) \(k(a) = 3a - 2\); Find \(k(4a)\)

25) \(h(n) = 2n - 2\); Find \(h\left(\frac{n}{2}\right)\)

26) \(p(x) = 2x - 5\); Find \(p(3 + x)\)

27) \(f(a) = 4a + 3\); Find \(f(4a)\)

28) \(w(n) = 2n - 1\); Find \(w(-3n)\)

29) \(p(n) = -n - 2\); Find \(p(-3n)\)

30) \(w(a) = a - 3\); Find \(w(3a)\)
Function Notation: relationship between input and output

\[ f(x) = 2x + 3 \]
"f at x"

Example:
\[ f(x) = 3x^2 + x \]
\[ f(2) = 3(2)^2 + (2) \]
\[ f(2) = 14 \]

Example:
\[ f(x) = 3x + 4 \]
\[ f(x) = 13 \]
\[ 13 = 3x + 4 \]
\[ -4 = 3x \]
\[ \frac{9}{3} = \frac{3x}{3} \]
\[ 3 = x \]

To add or subtract functions, you **MUST** simplify
EXAMPLE 1

\[ g(x) = 2x + 6 \quad f(x) = 7x - 5 \]

Find \( f(x) + g(x) \)

\[
(7x - 5) + (2x + 6) = 7x - 5 + 2x + 6 = 9x + 1
\]

EXAMPLE 2

\[ g(x) = 2x + 6 \quad f(x) = 7x - 5 \]

Find \( f(x) - g(x) \)

\[
(7x - 5) - (2x + 6) = 7x - 5 - 2x - 6 = 5x - 11
\]

EXAMPLE 3

\[ g(x) = 2x + 6 \quad f(x) = 7x - 5 \]

Find \( (f + g)(3) \)

\[
(7x - 5) + (2x + 6) = 7x + 2x + 6 - 5 = 9x + 1
\]

\[ g(3) + 1 = 9(3) + 1 = 28 \]
Evaluate add/subtract

Perform the indicated operation.

1) \( g(n) = -2n + 5 \)
   \( h(n) = n^2 - 2 \)
   Find \((g - h)(1)\)

2) \( f(n) = n^2 - 1 \)
   \( g(n) = -4n + 4 \)
   Find \((f - g)(5)\)

3) \( f(t) = t + 5 \)
   \( g(t) = 3t + 1 \)
   Find \((f + g)(-3)\)

4) \( f(x) = 3x - 4 \)
   \( g(x) = x^2 + 2x \)
   Find \((f + g)(-4)\)

5) \( f(n) = n - 4 \)
   \( g(n) = 2n + 4 \)
   Find \((f + g)(-4)\)

6) \( g(x) = 2x - 5 \)
   \( f(x) = 3x + 1 \)
   Find \((g - f)(-6)\)

7) \( g(x) = 2x^2 - x \)
   \( h(x) = x + 5 \)
   Find \((g + h)(3)\)

8) \( g(a) = 4a + 5 \)
   \( h(a) = 3a^2 + 4a \)
   Find \((g + h)(2)\)

9) \( f(n) = 3n^3 - 5 - 2n \)
   \( g(n) = 2n - 3 \)
   Find \((f - g)(4)\)

10) \( f(x) = 2x + 4 \)
    \( g(x) = 3x + 4 \)
    Find \((f + g)(4)\)

11) \( h(x) = x^3 - 1 + x \)
    \( g(x) = 4x + 4 \)
    Find \((h - g)(4)\)

12) \( g(x) = -3x + 1 \)
    \( h(x) = x^3 + 4x \)
    Find \((g - h)(3)\)

13) \( g(x) = 2x^2 + 3 \)
    \( h(x) = 2x + 3 \)
    Find \((g + h)(-4)\)

14) \( g(n) = 3n - 5 \)
    \( h(n) = 2n^2 + 3n \)
    Find \((g - h)(-3)\)

15) \( g(n) = 3n + 2 \)
    \( h(n) = n^3 - 2n^2 \)
    Find \((g - h)(-5)\)

16) \( g(n) = n^2 - 4n \)
    \( h(n) = n + 4 \)
    Find \((g - h)(-6)\)

17) \( g(x) = x^2 + x \)
    \( f(x) = 2x - 1 \)
    Find \((g - f)(3)\)

18) \( f(x) = 2x - 2 \)
    \( g(x) = -2x + 2 \)
    Find \((f + g)(-3)\)
Writing rule add/subtract

Perform the indicated operation.

1) \( f(x) = 2x + 3 \)
   \( g(x) = x - 3 \)
   Find \( f(x) - g(x) \)

2) \( g(t) = t^2 + 7t \)
   \( h(t) = 2t - 2 \)
   Find \( g(t) + h(t) \)

3) \( h(x) = 3x + 1 \)
   \( g(x) = x^3 - 4 \)
   Find \( h(x) - g(x) \)

4) \( h(t) = -4t + 3 \)
   \( g(t) = t^3 - 3t^2 - t \)
   Find \( h(t) + g(t) \)

5) \( g(x) = 3x + 3 \)
   \( f(x) = 4x + 5 \)
   Find \( g(x) - f(x) \)

6) \( f(x) = 3x \)
   \( g(x) = x^2 - 3 \)
   Find \( f(x) + g(x) \)

7) \( f(n) = n^2 - 1 \)
   \( g(n) = 2n - 3 \)
   Find \( f(n) + g(n) \)

8) \( f(x) = 2x - 5 \)
   \( g(x) = x^2 - 5 \)
   Find \( f(x) + g(x) \)

9) \( g(x) = -x^2 - 4x \)
   \( f(x) = 4x + 1 \)
   Find \( g(x) - f(x) \)

10) \( g(x) = -3x - 2 \)
    \( h(x) = x^2 - 2x \)
    Find \( g(x) - h(x) \)

11) \( g(n) = -4n - 1 \)
    \( h(n) = n^2 + 3 \)
    Find \( g(n) + h(n) \)

12) \( h(x) = 4x + 4 \)
    \( g(x) = 2x^2 - 1 \)
    Find \( h(x) + g(x) \)

13) \( h(x) = 2x - 1 \)
    \( g(x) = 2x^3 + 4x^2 \)
    Find \( h(x) - g(x) \)

14) \( f(x) = -x - 1 \)
    \( g(x) = -x - 3 \)
    Find \( f(x) - g(x) \)

15) \( g(t) = 2t - 2 \)
    \( h(t) = -3t - 3 \)
    Find \( g(t) + h(t) \)

16) \( g(a) = 3a - 1 \)
    \( f(a) = a^3 + 2a^2 - 2a \)
    Find \( g(a) + f(a) \)

17) \( f(n) = n^2 - 4 \)
    \( g(n) = n + 5 \)
    Find \( f(n) - g(n) \)

18) \( g(n) = -2n - 5 \)
    \( h(n) = n^2 + 6n \)
    Find \( g(n) - h(n) \)
Function Children’s Tale

You are creating a children’s tale about function notation. Your tale must tell a story which incorporates the following:

What is function notation (20 points)
How do you say it properly (20 points)
How do find f(#) when given a function (30 points)
How do you find x when given f(x) = # (30 points)

It must have a cover. (20 points)
It must be a minimum of 10 pages. (30 points)
It must include a kid friendly character(s). (20 points)
It must be colorful. (30 points)
Remember a children’s book is bright and colorful. On each page there is only about 3-4 sentences.

This is due by the end of class tomorrow. Every day it is late results in 20 points lost per day.

You can earn 30 points extra credit by incorporating adding and subtracting functions.

You may do this on paper or on the chromebook.
Week 5
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 10/2/17

Unit 1: Pre-Assessment and Review (Functions, Linear Functions, Exponents)

Target Skills

Day 1/2 Skill: Function Notation (review)

Day 3 Skill: Determining f(x) Using Graphs and Tables
<table>
<thead>
<tr>
<th>Time</th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARM-UP</td>
<td>Type I: If you could have any super power, what would it be and why?</td>
<td>Type II: Find f(n)</td>
<td>Type I: What is your favorite season and why?</td>
<td>Type II: Given a table, find f(x)</td>
<td>Type II: Find f(x) given a graph</td>
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<td>NOTES</td>
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<td>Review</td>
<td>Determining f(x) using graphs and tables</td>
<td>Review function notation</td>
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<tr>
<td>TASK 1</td>
<td>Review worksheets—Given f(#), find output and Given f(x)=#, find x 20 problems (20 minutes)</td>
<td>Students write on desks with expo markers 1 graph, 3 questions (30 minutes) Pairs 1 table, 3 questions (12 minutes) Guided</td>
<td>Round robin review (60 minutes)</td>
<td>Round robin assessment (10 rounds) (50 minutes)</td>
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<td>TASK 2</td>
<td>Review worksheet Adding and subtracting functions (20 minutes)</td>
<td>Kahoot! Review Game (30 minutes) Groups or individual teams</td>
<td>Determine f(x) from graphs (15 minutes) Pairs/Individual</td>
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<td><strong>Materials</strong></td>
<td>• Warm-Up (pink sheet)</td>
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<td>• Notes (gold sheet)</td>
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<td>I can...</td>
<td>I can explain that when $x$ is an input of a function, $f(x)$ represents the corresponding output.</td>
<td>I can explain that when $x$ is an input of a function, $f(x)$ represents the corresponding output.</td>
<td>I can define relation, domain and range.</td>
<td>I can explain that when $x$ is an input of a function, $f(x)$ represents the corresponding output.</td>
<td>I can determine if a graph, table, or set of ordered pairs represents a function.</td>
</tr>
<tr>
<td>I will...</td>
<td>I will be able to use function notation and add and subtract functions</td>
<td>I will be able to use function notation and add and subtract functions</td>
<td>I will be able to use function notation with tables and graphs</td>
<td>I will be able to use function notation</td>
<td>I will be able to use function notation</td>
</tr>
<tr>
<td>CC Standards</td>
<td><strong>HSF-IF.A.1:</strong> Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If $f$ is a function and $x$ is an element of its domain, then $f(x)$ denotes the output of $f$ corresponding to the</td>
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</tr>
<tr>
<td>input $x$. The graph of $f$ is the graph of the equation $y = f(x)$</td>
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<td>input $x$. The graph of $f$ is the graph of the equation $y = f(x)$</td>
<td></td>
</tr>
</tbody>
</table>
$y = 2x + 1$

output  input

$f(x) = 2x + 1$
EXAMPLE 1

\[ f(x) = 2x + 1 \]
\[ f(x) = 13 \]
\[ 13 = 2x + 1 \]
\[ -1 = 2x \]
\[ \frac{12}{2} = \frac{2x}{2} \]

EXAMPLE 2

\[ f(x) = -3x + 2 \]
\[ f(4) = -3(4) + 2 \]
\[ -12 + 2 \]
\[ f(4) = -10 \]

EXAMPLE 3

\[ f(x) = 7x + 2 \]
\[ g(x) = 3x - 10 \]
\[ f(x) - g(x) \]
\[ 7x + 2 - (3x - 10) \]
\[ 7x + 2 - 3x + 10 \]
\[ 4x + 12 \]
Review Find F(#) and x when given F(x)=#

Evaluate each function.

1) \( f(x) = 2x + 3 \); Find \( f(-5) \)

2) \( h(x) = x - 3 \); Find \( h(0) \)

3) \( h(n) = -n + 1 \); Find \( h(-4) \)

4) \( p(x) = 4x + 3 \); Find \( p(2) \)

5) \( h(a) = -2a \); Find \( h(-3) \)

6) \( k(x) = 4x + 2 \); Find \( k(-9) \)

7) \( h(x) = 4x + 3 \); Find \( h(-10) \)

8) \( p(n) = 3n + 2 \); Find \( p(-5) \)

9) Use the function from question 1 and solve for \( x \) given \( f(x) = 13 \).

10) Use the function from question 2 and solve for \( x \) given \( h(x) = -15 \).

11) Use the function from question 3 and solve for \( n \) given \( h(n) = 7 \).

12) Use the function from question 4 and solve for \( x \) given \( p(x) = -17 \).

13) Use the function from question 5 and solve for \( a \) given \( h(a) = 36 \).

14) Use the function from question 6 and solve for \( x \) given \( k(x) = 38 \).

15) Use the function from question 7 and solve for \( x \) given \( h(x) = -37 \).

16) Use the function from question 8 and solve for \( n \) given \( p(n) = 47 \).
Review of add/subtract function

Perform the indicated operation.

1) \( f(a) = a^3 + 5a^2 \)
\( g(a) = 4a + 3 \)
Find \((f - g)(a)\)

2) \( h(n) = 4n \)
\( g(n) = -2n \)
Find \((h + g)(n)\)

3) \( g(x) = x^2 - 2 \)
\( h(x) = x + 4 \)
Find \((g - h)(x)\)

4) \( h(x) = -3x \)
\( g(x) = 4x + 3 \)
Find \((h - g)(x)\)

5) \( g(n) = 2n - 3 \)
\( f(n) = 2n^2 + 3 - 2n \)
Find \((g + f)(n)\)

6) \( f(x) = -3x + 4 \)
\( g(x) = 4x - 2 \)
Find \((f - g)(x)\)

7) \( f(n) = n^3 + 4n^2 \)
\( g(n) = 2n + 1 \)
Find \((f - g)(n)\)

8) \( f(a) = -2a - 1 \)
\( g(a) = a^2 - 4 \)
Find \((f - g)(a)\)

9) \( f(t) = 3t - 2 \)
\( g(t) = 4t + 1 \)
Find \((f + g)(-6)\)

10) \( g(n) = n^3 + 5n \)
\( h(n) = 3n + 2 \)
Find \((g + h)(-3)\)

11) \( g(x) = 2x + 3 \)
\( f(x) = x + 5 \)
Find \((g + f)(-4)\)

12) \( h(x) = 4x \)
\( g(x) = -3x^2 - 4x \)
Find \((h - g)(1)\)

13) \( g(n) = n + 4 \)
\( h(n) = 2n - 1 \)
Find \((g + h)(4)\)

14) \( f(x) = x^2 - 5x \)
\( g(x) = 2x - 1 \)
Find \((f + g)(10)\)

15) \( g(t) = 3t - 2 \)
\( h(t) = 2t - 5 \)
Find \((g - h)(-1)\)

16) \( f(n) = n - 4 \)
\( g(n) = n - 1 \)
Find \((f - g)(6)\)
input = \( x \)

output = \( y \) or \( f(x) \)

coordinate: \( (x, y) \)

\[ f(x) = y \]
EXAMPLE 1

\[(1, -3)\]

\[x = 1\]
\[y = -3\]

\[f(1) = -3\]

EXAMPLE 2

\[f(-1) = \frac{2}{x}\]
\[f(x) = 0\]
\[x = -2, 2\]

EXAMPLE 3

\[
\begin{array}{c|cccc}
  x & -1 & 0 & 1 & 5 \\
  y & 3 & 0 & 4 & 1 \\
\end{array}
\]

\[f(-1) = 3, 4\]
\[f(x) = 6\]

\[x = 0\]
Evaluate the Function Given the Graph

Activity 1—Guided

1. \( f(2) = \) 
2. \( f(3) = \) 
3. \( f(-4) = \) 
4. \( f(x) = 0, \ x = \) , , 
5. \( f(x) = 4, \ x = \) 
Evaluate the Function Given the Table

Activity 2—Guided

<table>
<thead>
<tr>
<th>x</th>
<th>3</th>
<th>5</th>
<th>8</th>
<th>3</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(x)</td>
<td>4</td>
<td>0</td>
<td>-7</td>
<td>4</td>
<td>2</td>
<td>-6</td>
</tr>
</tbody>
</table>

1. \(f(3) = \underline{\hspace{2cm}}\)
2. \(f(0) = \underline{\hspace{2cm}}\)
3. \(f(8) = \underline{\hspace{2cm}}\)
4. \(f(x) = 0 \quad x = \underline{\hspace{2cm}}\)
5. \(f(x) = 4 \quad x = \underline{\hspace{2cm}}\)
6. \(f(x) = -6 \quad x = \underline{\hspace{2cm}}\)

7. Is this a function?!?!?!  
   Yes   No
1. Find F(2), F(-1), F(X) = 0, and F(X) = 6

2. Find F(-3), F(0), F(X) = -3, and F(X) = 3

3. Find F(0) and F(X) = -6

4. Find F(-6), F(0), F(X) = 2, and F(X) = -2

5. Find F(-1), F(0), F(X) = 1, and F(X) = 2

6. Find F(0), F(2), F(X) = 1, and F(X) = -2
1. Find $F(-3)$, $F(4)$, $F(X) = -6$, and $F(X) = 6$

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>6</td>
</tr>
<tr>
<td>-2</td>
<td>0</td>
</tr>
<tr>
<td>-1</td>
<td>-4</td>
</tr>
<tr>
<td>0</td>
<td>-6</td>
</tr>
<tr>
<td>1</td>
<td>-6</td>
</tr>
<tr>
<td>2</td>
<td>-4</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Find $F(6)$, $F(1)$, $F(X) = 32$, and $F(X) = 59$

Temperatures in NY City

<table>
<thead>
<tr>
<th>Day</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>52</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>5</td>
<td>59</td>
</tr>
<tr>
<td>6</td>
<td>67</td>
</tr>
</tbody>
</table>

3. Find $F$(rose), $F$(lily), and $F(X) = 4$

<table>
<thead>
<tr>
<th>Kind of flower</th>
<th>Number of flowers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rose</td>
<td>1</td>
</tr>
<tr>
<td>Tulip</td>
<td>5</td>
</tr>
<tr>
<td>Lily</td>
<td>5</td>
</tr>
<tr>
<td>Orchid</td>
<td>4</td>
</tr>
<tr>
<td>Forget-me-not</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>

4. Find $F(1)$, $F(3)$, $F(X) = 1$, and $F(X) = 3$

<table>
<thead>
<tr>
<th>$x$</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

5. Find $F(-2)$, $F(2)$, $F(X) = 0$, and $F(X) = 4$

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>5</td>
</tr>
<tr>
<td>-1</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

6. Find $F(2)$, $F(5)$, $F(X) = 8$ and $F(X) = 5$
1. Evaluate the following expressions given the functions below:

\[ g(x) = -3x + 1 \quad f(x) = x^2 + 7 \quad h(x) = \frac{12}{x} \quad j(x) = 2x + 9 \]

a. \( g(10) = \)  

b. \( f(3) = \)  

c. \( h(-2) = \)  

d. \( j(7) = \)

e. Find \( x \) if \( g(x) = 16 \)  

f. Find \( x \) if \( h(x) = -2 \)  

g. Find \( x \) if \( f(x) = 23 \)

2. Given \( f(x) = 3 - 4x \). Fill in the table and then sketch a graph.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-6</td>
<td>-5</td>
</tr>
<tr>
<td>-3</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>-5</td>
<td></td>
</tr>
</tbody>
</table>

3. Given \( f(x) = 2x + 6 \). Fill in the table and then sketch a graph.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
4. Translate the following statements into coordinate points, then plot them!

   a. \( f(-1) = 1 \)
   
   b. \( f(2) = 7 \)
   
   c. \( f(1) = -1 \)
   
   d. \( f(3) = 0 \)

5. Given this graph of the function \( f(x) \):

   Find:

   a. \( f(-4) = \)  
   b. \( f(0) = \)  
   c. \( f(3) = \)  
   d. \( f(-5) = \)  

   e. \( x \) when \( f(x) = 2 \)  
   f. \( x \) when \( f(x) = 0 \)

By L. Church and A. Sanfillippo
APPLICATION

6. Swine flu is attacking Porkopolis. The function below determines how many people have swine where \( t = \) time in days and \( S = \) the number of people in thousands.

\[
S(t) = 9t - 4
\]

a. Find \( S(4) \).

b. What does \( S(4) \) mean?

c. Find \( t \) when \( S(t) = 23 \).

d. What does \( S(t) = 23 \) mean?

e. Graph the function.

7. Evaluate the following:

\[
egin{align*}
  f(x) &= 2x + 5 &
  g(x) &= -3x - 1 &
  h(x) &= -8x + 2 &
  k(x) &= 3x^2 - 15
\end{align*}
\]

a. \( f(x) + h(x) \)

b. \( k(x) + g(x) \)

c. \( f(x) - h(x) \)

d. \( g(x) - k(x) \)
8. Evaluate the following:

\[ f(x) = 2x + 5 \quad g(x) = -3x - 1 \quad h(x) = -8x + 2 \quad k(x) = 3x^2 - 15 \]

a. \((k + h)(2)\)

b. \((g + f)(3)\)

c. \((h - f)(-1)\)

d. \((g - k)(2)\)

9. Evaluate the following:

\[ f(x) = 2x + 2 \quad g(x) = -x + 6 \quad h(x) = 4x - 11 \quad k(x) = x^2 + 1 \]

a. \(g(f(x))\)

b. \(h(f(x))\)

c. \(f(k(x))\)

d. \(f(h(x))\)
10. Evaluate the following:

\[ f(x) = 2x + 2 \quad g(x) = -x + 6 \quad h(x) = 4x - 11 \quad k(x) = x^2 + 1 \]

e. \( g(f(-2)) \)

f. \( h(f(4)) \)

g. \( f(k(2)) \)

h. \( f(h(1)) \)
1. Given $f(x) = 3x - 5$ find $f(9)$

2. Given $f(x) = -6x + 10$ find $f(3)$

3. Given $f(x) = x + 2$ find $f(-650)$

4. Given $f(x) = -x - 6$ find $f(-3)$

5. Given $f(x) = 7 - 4x$ find $f(7)$
1. Given \( f(x) = 3x - 5 \) find \( f(x) = 30 \)

2. Given \( f(x) = -6x + 10 \) find \( f(x) = 94 \)

3. Given \( f(x) = x + 2 \) find \( f(x) = -32 \)

4. Given \( f(x) = -x - 6 \) find \( f(x) = 1 \)

5. Given \( f(x) = 7 - 4x \) find \( f(x) = 65 \)
1. Given \( f(x) = 3x - 5 \) and \( g(x) = 4x^2 - 5 \)
   Find \( f(x) + g(x) \)

2. Given \( f(x) = -6x + 10 \) and \( g(x) = -x^2 - 10 \)
   Find \( f(x) + g(x) \)

3. Given \( k(a) = 2a \) and \( h(a) = -32 \)
   Find \( k(a) + h(a) \)

4. Given \( f(m) = -m - 6 \) and \( g(m) = 1 - 2m + 7m^2 \)
   Find \( f(m) + g(m) \)
1. Given $f(x) = 3x - 5$ and $g(x) = 4x^2 - 5$
   Find $(g - f)(x)$

2. Given $k(a) = 2a$ and $h(a) = -32$
   Find $(k - h)(a)$

3. Given $f(m) = 1 - 2m + 7m^2$ and $g(m) = -m - 6$
   Find $(f - g)(m)$

4. Given $h(a) = 3a + 35$ and $g(a) = -4a$
   Find $(h - g)(a)$
1. Given \( f(x) = 3x - 5 \) and \( g(x) = 4x^2 - 5 \)
Find \((f + g)(2)\)

2. Given \( k(a) = 2a \) and \( h(a) = -32 \)
Find \((k + h)(16)\)

3. Given \( f(m) = -m - 6 \) find \( g(m) = 1 - 2m + 7m^2 \)
Find \((f + g)(-6)\)
1. Given \( f(x) = 3x - 5 \) and \( g(x) = 4x^2 - 5 \)
   Find \((f - g)(2)\)

2. Given \( k(a) = 2a \) and \( h(a) = -32 \)
   Find \((k - h)(16)\)

3. Given \( f(m) = -m - 6 \) find \( g(m) = 1 - 2m + 7m^2 \)
   Find \((f - g)(-9)\)
Find

1. \( f(0) = \) __________

2. \( f(-3) = \) __________

3. \( f(4) = \) __________

4. \( f(2) = \) __________

5. Is this a function?
   Yes   No
Find

1. \( f(x) = 0 \)
   \[ x = \underline{\phantom{0}} \]

2. \( f(x) = 1.5 \)
   \[ x = \underline{\phantom{0}} \]

3. \( f(x) = 2 \)
   \[ x = \underline{\phantom{0}} \]

4. \( f(x) = 1 \)
   \[ x = \underline{\phantom{0}} \]

5. Is this a function?
   Yes      No
Directions: Given the table, find...

1. \( g(45) = \)
2. \( g(-25) = \)
3. \( g(3) = \)
4. \( g(4) = \)
5. \( g(87) = \)

Is this a function?   Yes   No

Given the table above, find...

1. \( f(3) = \)
2. \( f(1) = \)
3. \( f(-6) = \)
4. \( f(0) = \)
5. \( f(-7) = \)
6. \( f(8) = \)
7. \( f(2) = \)
8. \( f(5) = \)
Directions: Given the table, find...

1. \( g(x) = 51, \ x = \)
2. \( g(x) = 6, \ x = \)
3. \( g(x) = -10, \ x = \)
4. \( g(x) = 1, \ x = \)
5. \( g(x) = 25, \ x = \)

<table>
<thead>
<tr>
<th>x</th>
<th>g(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>87</td>
<td>51</td>
</tr>
<tr>
<td>-10</td>
<td>3</td>
</tr>
<tr>
<td>-34</td>
<td>6</td>
</tr>
<tr>
<td>65</td>
<td>3</td>
</tr>
<tr>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>-10</td>
</tr>
<tr>
<td>-25</td>
<td>45</td>
</tr>
<tr>
<td>1</td>
<td>51</td>
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</tbody>
</table>

<table>
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<tr>
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<th>-12</th>
<th>-10</th>
<th>-8</th>
<th>-6</th>
<th>-4</th>
<th>-2</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>f(a)</td>
<td>-12</td>
<td>-10</td>
<td>-8</td>
<td>-6</td>
<td>-4</td>
<td>-2</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

Given the table above, find...

1. \( f(a) = 6, \ a = \)
2. \( f(a) = 12, \ a = \)
3. \( f(a) = -6, \ a = \)
4. \( f(a) = -10, \ a = \)
5. \( f(a) = 0, \ a = \)
6. \( f(a) = 4, \ a = \)
7. \( f(a) = 8, \ a = \)
8. \( f(a) = -2, \ a = \)

Is this a function?!?!? Yes No
Week 6
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 10/9/17

Unit 1: Pre-Assessment and Review (Functions, Linear Functions, Exponents)

Target Skills

Day 1 Skill: Classifying Polynomials, Identifying Degree of Polynomials, Polynomials in Standard Form

Day 2/3 Skill: Adding and Subtracting Polynomials

Day 4 Skill: Multiplying Polynomials Part 1
<table>
<thead>
<tr>
<th></th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARM-UP</td>
<td>Type I: When do we have assessments?</td>
<td>Type II: Put the polynomial in standard form and identify the degree and leading coefficient</td>
<td>Type II: Subtract polynomials</td>
<td>Type I: If you could meet anybody in history, who would it be and why?</td>
<td>Type II: Multiply polynomials</td>
</tr>
<tr>
<td>NOTES</td>
<td>Polynomials intro</td>
<td>Adding and subtracting polynomials</td>
<td>Redo/Reiterate Adding and subtracting polynomials</td>
<td>Multiplying polynomials—Monomial times Monomial and Monomial times Binomial</td>
<td>None</td>
</tr>
</tbody>
</table>
| TASK 1 | Classifying Polynomials Worksheet (5-6 minutes)  
Identifying Degree of Polynomials Worksheet (7-10 minutes) | Add and Subtract Linear Expressions Worksheet (8-10 minutes) | Kuta 16 Add/Subtract Problems (10-12 minutes)         | Multiplying Monomials Worksheet (8-10 minutes)                           | Written Assessment (60 minutes)                  |
<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Activity Duration</th>
<th>Notes</th>
</tr>
</thead>
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<tr>
<td><strong>Task 2</strong></td>
<td><strong>Standard Form and Coefficients Worksheet (Intro to Polynomials) (12-15 minutes)</strong></td>
<td>Add and Subtract Binomials (10-12 minutes)</td>
<td>Adding and Subtracting Linear Expressions (12-15 minutes)</td>
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<tr>
<td><strong>Task 3</strong></td>
<td><strong>Desmos Activity “Intro to Polynomials” (15 minutes)</strong> Challenge Question for those that finish early</td>
<td>Add and Subtract Polynomials (2 polynomials with up to 3 terms) worksheet (12-15 minutes) Plus CHALLENGE worksheet for those that finish early</td>
<td>Add/Subtract Polynomials October 11(^{th}) (20 minutes)</td>
</tr>
<tr>
<td><strong>Quiz</strong></td>
<td><strong>Given one polynomial Put polynomial in standard form Identify leading coefficient</strong></td>
<td>2 Examples—1 Add, 1 Subtract</td>
<td>2 Examples—Monomials and Monomial with Polynomial</td>
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<tr>
<td></td>
<td>Identify degree</td>
<td>Classify polynomial</td>
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<td>CLOSURE (2-4 minutes)</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on today’s lesson</td>
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</tr>
<tr>
<td>Materials</td>
<td>• Warm-Up (pink sheet) • Notes (gold sheet) • Quiz (tan sheet) • Calculators</td>
<td>• Warm-Up (pink sheet) • Notes (gold sheet) • Quiz (tan sheet) • Homework (green sheet) • Calculators</td>
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<tr>
<td>Vocabulary</td>
<td>• polynomial • monomial • binomial • trinomial • standard form • degree • coefficient</td>
<td>(No new) • polynomial • monomial • binomial • trinomial • standard form • degree</td>
<td>(No new) • polynomial • monomial • binomial • trinomial • standard form • degree</td>
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<tr>
<td>Leading Coefficient</td>
<td>Term</td>
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<td>Term</td>
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<td>I can...</td>
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<td>I can...</td>
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<td>I can identify the degree and leading coefficient of a polynomial</td>
<td></td>
<td>I can add, subtract, and multiply polynomials.</td>
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<tr>
<td>I will...</td>
<td></td>
<td>I will be able to identify names, degrees, and coefficients of polynomials in standard form.</td>
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<td>CC Standards</td>
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<td>HSA-APR.A.1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
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</table>
algebraic expression: has numbers, letters (variables), and operations (+, −, ÷)

ex: 2x + 6

term: each part of an algebraic expression

ex: for 2x + 6, the terms are 2x and 6

exponent: the number above example x^2 y^3

monomial: has 1 term ex: 4xy^2z

binomial: has 2 terms ex: 2x + 3xy

triomial: has 3 terms ex: 4a + 7b + 9c

degree: total exponent value of a term; choose the highest

ex: 6x^2y^4 2+4=6

coefficient: number in front of the variable

ex: 7xy

standard form: list terms from highest degree to lowest degree

ex: 4x + 3x^2 − 10 → 3x^2 + 4x − 10

leading coefficient: the coefficient of the 1st term in standard form

ex: (4)x^4 − 3x^2 + 7
EXAMPLE 1

\[ 3x^3y^2 + 4x^2yz^3 \]

degree? 6

EXAMPLE 2

\[ 2x - 12 + 14x^5 - 20x^3 \]

S.F.: \[ 14x^5 - 20x^3 + 2x - 12 \]
degree: 5
L.C.: 14

EXAMPLE 3

\[ 13xy^3z^4 + 10y^{10} - 12x^5y^5z \]

Degree: 11
Name: trinomial
Identifying Polynomials

Identify the type for each.

1) \(-5h - g - r - q\)  
6) \(6py + 4d - 7x\)

2) \(-gy - 2x + 9h + 5z - 3b\)  
7) \(-3k^5 - x + h - d\)

3) \(6y^6d^3z\)  
8) \(rg - 7x\)

4) \(cx + 7s - 9k + 8b\)  
9) \(5by^5r^7 - 2z^6 - 9d^2p^3 - 7p^2g^4 - 6q^6\)

5) \(3c^3\)  
10) \(3px^7 - 2y^5 + 6s^6r^4 - 9d^7z^4 - 5y^3s^6\)
Identifying Polynomials

Identify the degree for each.

1) \(-3gd^6s\)

2) \(-5n\)

3) \(9z^2p^4x^3 + 8y^6\)

4) \(2s^5k + 7p\)

5) \(5d^4h^6\)

6) \(3bq\)

7) \(-5z b^2 - 4q^5 - 3s^4r^3\)

8) \(9hr + 3c - 4z\)

9) \(dz + 7x\)

10) \(-s\)
PART 1: For each of the following polynomials, put the polynomial in standard form. Then, identify the leading coefficient.

1. \(5h^6 - 2h^2 + 7h - 4h^5\)
   
   Standard form:

   What is the leading coefficient? _____

2. \(5y^3 + 9y - 2y^2\)
   
   Standard form:

   What is the leading coefficient? _____

3. \(5a^3 - 9264a + 27a^{18} + a^{10}\)
   
   Standard form:

   What is the leading coefficient? _____

4. \(56y^3 + 927y^{13} - 2y^2 + 29y^{72} - 3y + 20\)
   
   Standard form:

   What is the leading coefficient? _____

5. \(3x^5 - 18x + 13x^3 - 17x^{90} - 31x^{89} - 3x^4 + 45x^{47}\)
   
   Standard form:

   What is the leading coefficient? _____
Name: __________________________

Introduction to Polynomials—Day 1

PART 2: For each of the following polynomials, put the polynomial in standard form. Then, identify the coefficient requested.

1. $4x^5 - x^7 - 35x^3 - 28$
   Standard form:

   What is the coefficient of the 2\textsuperscript{nd} term in standard form? ______

2. $4y^5 + 3y - 2y^8 + 3y^2 + 26y^7 + y^3$
   Standard form:

   What is the coefficient of the 5\textsuperscript{th} term in standard form? ______

3. $7h^2 + 10h^7 - 10h^4 + 7h^3 + 10h + 30$
   Standard form:

   What is the coefficient of the 2\textsuperscript{nd} term in standard form? ______

4. $3x^2 + 7x^8 - 2x - 6x^5$
   Standard form:

   What is the coefficient of the 3\textsuperscript{rd} term in standard form? ______

5. Challenge: $12x^3 + 7x^2 + 9x^3 - 38x + 10 + 4x$

   Standard form (\textit{Hint—simplify!}):

   What is the leading coefficient? ______
1. Have students log into Chrome Books.
2. Go to https://teacher.desmos.com/activitybuilder/custom/59d9a12a7abd832c7032d150
3. Click on “Create Class Code”
4. Display class code and collect results.
**RULES**

1. When subtracting polys, write \(-1(\ )\) and distribute the \(-1\) to ALL terms inside!

2. When adding & subtracting polys, simplify (add like terms) \(3x^2y\) \(5x^2y\)

3. When adding & subtracting polys, do NOT change the variable! Only ADD/SUBTRACT coefficient.
   
i.e.: \(2xy + 8xy = 10xy\)

4. Answer in S.F.
EXAMPLE 1

ADD \((3x^2 + 3)\) and \((10 - 6x^2)\)

\[3x^2 + 3 + 10 - 6x^2\]

\[-3x^2 + 13\]

EXAMPLE 2

SUBTRACT \(3x + 4\) from \(12x\)

\[(12x) - 1(3x + 4)\]

\[12x - 3x - 4\]

\[9x - 4\]

EXAMPLE 3

\[(6x^2 - 3) - 1(2x - 8) + (2x^2 + x)\]

\[6x^2 - 3 - 2x + 8 + 2x^2 + x\]

\[8x^2 - x + 5\]
Simplify each expression.

1. \((-6p - 8) - (2p - 6)\)
2. \((-8r - 2) + (4r - 3)\)
3. \((-z - 8) - (6z - 5)\)
4. \((-s - 5) + (-2s + 2)\)
5. \((-7s + 4) - (-8s + 4)\)
6. \((-4f + 9) - (8f + 9)\)
7. \((-8f) + (-f + 8)\)
8. \((4p - 4) + (-7p - 7)\)
9. \((7v - 9) - (6v + 9)\)
10. \((-3g) + (5g - 5)\)
1.) \((4 + 5x) - (4x + 1)\)

2.) \((3x^2 - 3x^3) - (3x^2 + 4x^3)\)

3.) \((5n^4 + 5) - (2n^4 + 2)\)

4.) \((4x^3 - 4x^2) + (2x^2 + 2x^3)\)

5.) \((4x^2 - 3) - (3x^2 - 1)\)

6.) \((5 - 3x^3) + (1 + 5x^3)\)

7.) \((4n - 5) - (3 - 4n)\)

8.) \((3x - 3x^4) + (x + 5x^4)\)

9.) \((4x - 5x^3) + (2x^3 - 3x)\)

10.) \((2x^2 - 5x) + (x^2 + 5x^3)\)
Adding and Subtracting Polynomials

Simplify each expression.

1) \((3r^5 - 5) - (6r^5 - 7 + 9r^2)\)

6) \((6n + 9 + 3n^3) + (8n^3 - 4 + 7n^5)\)

2) \((2p^4 + 8p^3) - (4p^3 + 5p + 3p^4)\)

7) \((7r^3 - 8) - (2r^3 + 3 + r^4)\)

3) \((4 - 7y^2 + 8y^4) + (6y - 2y^4 + 5)\)

8) \((6g^4 + 3) - (5 + 9g^3 - 7g^4)\)

4) \((9y - 3y^2) - (2y^2 + 7y)\)

9) \((5 + 8b^4) + (7b^5 - 4 - 9b^4)\)

5) \((5r^3 - 7r^5) - (3r^5 - 2)\)

10) \((5 - 4q^4) - (7q^4 + 8)\)
Adding and Subtracting Polynomials

Simplify each expression.

1) \((5x^2 - 6x) - (2x - 4x^2)\)

2) \((6n^2 - 9n^4) + (5n^2 - 8n^3) + (3n^3 - 7n^4 + 4n^2)\)

3) \((n^2 + 7n^5 + 8) - (5n^2 - 9 - 4n^5) - (2n^2 + 6n + 3)\)

4) \((3h^2 - 2h^3) - (7h^4 + 4h^3 + 9) + (5h^4 - 6h + 8)\)

5) \((6 + 8c^3 - 7c^4) + (9c^4 - 4c^2 - 3) + (c^3 + 2c^2 + 5)\)

6) \((4 + 3p^3 + 2p^4) + (7p^4 + 9p^2 - 8) - (5p^3 + 6p^2)\)

7) \((6s^2 + 4s^4 + 8s) + (7s^2 - 9s^3) + (2s^3 - 5s^4 + 3s^2)\)

8) \((6b - 8b^4) + (2b + 9b^4) - (4b + 5b^2 - 3b^4)\)

9) \((8 + 3p^5) + (9p^5 + 2)\)

10) \((6p^4 - 9p^2 - 7p) + (3p^2 - 8p) + (2p + 5p^2 - 4p^4)\)
October 11th Add/Subtract

Simplify each expression.

1) \((-4 + 8k^2) - (4k^2 + 6)\)

2) \((2n^4 + 3n) - (2n + 8n^4)\)

3) \((-8x^4 + 8x^2) - (-6x^4 - 6x^2)\)

4) \((5 + 5r) - (8r^2 + 8)\)

5) \((-2 - 8x^2) + (-x^2 - 2)\)

6) \((5x^3 + x^2) - (-x^2 + x^3)\)

7) \((x^3 - 7) + (-2 - x^3)\)

8) \((-1 + x^4) - (-8x^4 + 7)\)

9) \((-3x^2 + 3x^2 + 2) + (-3x^4 - 2x^2 + 2)\)

10) \((-4m^3 - 6m^4 + 2m) + (2m^4 - 3m - 2m^3)\)

11) \((-3n^3 - 7n^4 - 1) - (-3 - 5n^4 - 6n^3)\)

12) \((-6r^2 + 8r^3 + 7r^4) + (3r^2 + 2r^3 + 3r^4)\)

13) \((8 - 6v - v^3) - (5v^3 - 6 - v)\)

14) \((4r^3 - r + 5) - (3 - 5r^2 - 4r^3)\)

15) \((-5x^4 + 5 + 2x) - (8x^4 - 4 + 6x)\)

16) \((2x^4 + 3 - 3x) - (1 - 7x^4 + 7x)\)
Adding Linear Expressions

1. Add $4r - 1$ and $5r - 1$

2. Add $8x + 9$ and $-10x + 20$

3. Add $10 - 7p$ and $12 + p$

4. $(4x + 9) + (4x + 10)$

5. $(4 + 3f) + (-16 - 9f)$

6. $(2 + 9k) + (10k - 3) + (-3k + 4)$
Subtracting Linear Expressions

1. Subtract $7x$ from $2x + 1$

2. Subtract $10p + 8$ from $-20p + 3$

3. $(20x + 9) - (4x + 10)$

4. $(-4p - 10) - (p + 10)$

5. $(9f + 7) - (13 - 12f)$

6. $(3 + 8k) - (-10k + 4) - (6 - 2k)$
Adding and Subtracting Polynomials October 11th

1. \((2x^2) - (9x^2 + 2x)\)
2. \((4x^2 - 10) + (2x - 6x^2)\)
3. \((3 + k) - (-9 + k)\)

4. \((5g^3 - 6g) + (g - 10g^3)\)
5. \((4f^5 + f^7) - (7f + 8f^5)\)
6. \((70 + h) - (h^2 + 60)\)

7. \((6y + 9) - (y^2 - y + 8)\)
8. \((14 + p^8 - p^4) + (-4p^8 - 6)\)
9. \((k^3 + 16k^2 + 6) - (2k - 7k^3)\)

10. \((x + y - z) - (z - y + x)\)
11. \((5xy + 6y) - (2 + 3xy)\)
12. \((7x^2 - 2x^2y) - (10x^2y + 9)\)

13. \((78a^{10} - 12a) - (6a^5 - 2a^{10} + a) + (a - 6)\)
14. \((19y^7 - 3y^5 + 29) + (17 - 3y^6 - 13y^7)\)
INTRODUCTION TO MULTIPLYING POLYNOMIALS

October 12, 2017
When multiplying polynomials...

• Multiply the coefficients by each other and multiply the variables by each other

\[ 4x \cdot 6y = 24xy \]
When multiplying polynomials...

- Now you can ADD exponents of the **same** variable

\[
\begin{align*}
    x^2 \cdot x^3 &= 3x^5 \\
    x^{2+3} &= 3 \cdot 5 \cdot x^5 \cdot x^4 \\
    x^5 &= 3 \cdot 5 \cdot x^{5+4} \\
    15x^9 &= 15x^9
\end{align*}
\]
When multiplying polynomials...

- You may need to use the **distributive property**

\[
3x(5x + 3) \\
(3x \cdot 5x) + (3x \cdot 3) \\
15x^2 + 9x
\]
When using the distributive property...

- You can use the box method to help you keep organized.

\[3x(5x - 3)\]

\[
\begin{array}{c|c}
5x & -3 \\
3x & 15x^2 & -9x \\
\end{array}
\]

\[= 15x^2 - 9x\]
WARNING

• You must still obey all rules for adding and subtracting polynomials!

\[
6x^2 + 4x^2 = 10x^2 \\
6x^2 - 4x^2 = 2x^2 \\
6x^2 \cdot 4x^2 = 24x^4
\]
Rules to remember when MULTIPLYING:

- Multiply the *coefficients* by each other and multiply the *variables* by each other
- Now you can ADD exponents of the *same* variable
- You may need to use the *distributive property*
- You can use the *box method* to help you keep organized when doing the distributive property
- You must still obey all rules for adding and subtracting polynomials!
Name ________________________________

Multiplying Monomials Worksheet 3

Find each product.

1) \(6g^2 \cdot 5g = \) ___________
2) \(-8h^3 \cdot 4h^2 = \) ___________

3) \(-10v^3 \cdot 10v = \) ___________
4) \(-4x^5 \cdot 5x^3 = \) ___________

5) \(7b^3 \cdot 9b = \) ___________
6) \(2m^4 \cdot 10m^2 = \) ___________

7) \(-9n^2 \cdot 7n^3 = \) ___________
8) \(5y^5 \cdot 5y = \) ___________

9) \(-8z^2 \cdot -4z^3 = \) ___________
10) \(3p \cdot 6p = \) ___________

11) \(9k^3 \cdot 6k = \) ___________
12) \(6c^7 \cdot 5c = \) ___________

Tons of Free Math Worksheets at: © www.mathworksheetsland.com
Multiplying Polynomials—Day 1
Guided Monomials times Binomials

The following shows how to use the box method for multiplying polynomials. Example:

\[ 2x(8x + 6) = \]

\[
\begin{array}{c|c}
8x & 6 \\
\hline
2x & 16x^2 & 12x \\
\end{array}
\]

\[ = 16x^2 + 12x \]

Using the example above, multiply the polynomials.

1. \[ 7x(5x + 4) = \]

2. \[ 2k(2 + 3k) = \]

3. \[ -9y(y + 3) = \]

4. \[ -2f(12f + 9) = \]

5. \[ 5h(2h^3 + 9) = \]

6. \[ 2y(3y + 9y^3) = \]
Multiplying Polynomials—Day 1
Guided Monomials times Binomials

7. \(-5k(2k^2 + 9k^4)\) = 

8. \(2y(3y + 9y^3)\) = 

9. \(3x^2(2 + 10x^6)\) = 

10. \(2a^3(3a + 2a^6)\) = 

11. \(2g^2(g^8 + 10g^2)\) = 
Now, consider when the binomial has subtraction. **Notice how instead of + signs, now there are – signs.**

Example:

\[ 3x(4 - 7x) = \]

\[
\begin{array}{c|c|c}
 & 4 & -7x \\
3x & 12x & -21x^2 \\
\end{array}
\]

\[= 12x - 21x^2 \]

In standard form:

\[= -21x^2 + 12x \]

Using the example above, multiply the polynomials.

1. \(2k(4k - 10) = \)

2. \(4x(12 - 3x) = \)

3. \(-4p(3p - 5) = \)

4. \(8y(1 - 6y) = \)
Multiplying Polynomials—Day 1
Guided Monomials times Binomials

5. \(-5x(7 - 3x^2) = \)

6. \(10p^3(6p^4 - 2p^2) = \)

7. \(6m^2(4m - 8m^5) = \)

8. \(-7x^4(6x^7 - 3x^2) = \)
Friday the 13th Assessment

1. Name the polynomial by drawing lines to the correct name. Each name can match up with more than one expression.

   a. $3x^2y^7z^5 + 1$
   b. $2x + 6y$
   c. $2c^7 + 8c + 2b + 10 - 4d^8$
   d. $9p + 10q + 328r$
   e. $4f^{11} + 6f^{10} - 34f^{23} + 1 - 2f^3$
   f. $903726k^2c^1h^2s^7$
   g. $7gh^8 - 3g^4h$
   h. $10j^2 - m^4 - 2k + 2m - 4n$
   i. $456abc - 789a^2b^2c^2$
   j. $2w + 8x - 6y + 18z - 3$
   k. $16b^8$

2. Name the degree.

   a. $12a^2b^7 - 2a^3bc^4$
   b. $2xy^2 + 2x^2y^3$
   c. $5m^2n^8 - 6m^5n^3 + 9m^3m^7$
   d. $200x$
   e. $6g^5 - 7h^6 + 8g^2h^5$
   f. $12a^2b^7 - 2a^3bc^4$
   g. $90326k^2c^1h^2s^7$
   h. $10j^2 - m^4 - 2k + 2m - 4n$
3. Sarah and Jake were doing a math problem that had to be in standard form.

Sarah wrote: \(9x^2 + 8x^3 + 7x^4 + 6x^5\)

Jake wrote: \(6x^5 + 7x^4 + 8x^3 + 9x^2\)

Who wrote their answer in *standard form*? (Circle) Sarah Jake

EXPLAIN your choice in 2 sentences:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

4. Add the polynomials and put your answer in **STANDARD FORM**. Circle/box your answer.

a. \((2x + 7x^2) + (3x + 2x^2)\)

b. \((3x - 2) + (-4x + 7)\)

c. \((8x^2y - 2x) + (8y - 4x^2y)\)
5. Subtract the polynomials and put your answer in **STANDARD FORM**.
   Circle/box your answer.

   a. \((2x - 10) - (4x + 5)\)

   b. \((7y^2 - 8y) - (2y - 3y^2)\)

   c. \((6a^3 + 5a) - (7a^2 - 4a)\)

6. For the polynomial \(4x^2 + 7x - 2x^4 + 10x\), Chris wrote this on his warm-up:
   
   Degree = 4
   Leading Coefficient = 4

   Is he correct? (Circle) Yes No

   If you circled “No,” how would you fix it?
7. Put the following polynomial in standard form, and tell us the leading coefficient and the degree.

\[ 5x^2 + 2x - 4x^4 + 3x^8 \]

Standard Form:
Leading Coefficient:
Degree:

8. Put the following polynomial in standard form, and tell us the leading coefficient and the degree.

\[ 8x^2y^7 - 4x^9y + 2x^2y^2z^2 - 10x^{13}y \]

Standard Form:
Leading Coefficient:
Degree:

9. Multiply the monomials.
   a. \( 6p^7 \cdot 5p^4 = \)
   b. \( 6x^2y^4 \cdot 5x^7y^3 = \)
   c. \( -3ab^4c \cdot 4a^2bc^2 = \)
10. Multiply the polynomials and put your answer in **standard form**.
   
   a. \(2x(3x + 1)\)  
      **Hint:** Use the box method.

   b. \(3y(7y - 2y^4)\)  
      **Hint:** Use the box method.

   c. \(2a^3(-7a^3 + 2a)\)  
      **Hint:** Use the box method.

11. **Type III:** Mr. Gardner is doing an evaluation of Ms. Church. The only way that she can keep her job is if you can explain what you learned this week.

   **Requirements:**
   
   a. You must use a minimum of 15 *complete* sentences.
   
   b. Cover all mathematical topics of this week (Monday through Thursday)
   
   c. You must have 4 examples to illustrate your topics that are correctly solved. The examples can NOT come from your notes or activities, but you may use them to help you structure your examples.
Week 7
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 10/16/17

Unit 2: Polynomials

*Target Skills*

Day 2 Skill: Multiplying Polynomials Part 2 (Binomials times Binomials)

Day 4 Skill: Multiplying Polynomials Part 3 (Polynomials times Polynomials)
<table>
<thead>
<tr>
<th></th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY (Half Day)</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARM-UP</td>
<td>Type I: What would you do if you won the lottery?</td>
<td>Type II: Multiply Monomial by Binomial</td>
<td>Type I: Are you a morning or night person?</td>
<td>Type II: Multiply binomial by binomial</td>
<td>Type II: Multiply polynomial by polynomial</td>
</tr>
<tr>
<td>NOTES</td>
<td>Pass back and make-up day</td>
<td>Multiplying Binomials by Binomials</td>
<td>None</td>
<td>Multiplying Polynomials by Polynomials (tri by tri) (5 minutes)</td>
<td>None</td>
</tr>
<tr>
<td>TASK 1</td>
<td>Pass work back to individuals (15-20 minutes)</td>
<td>Multiplying Binomials (Easy) Worksheet (12-15 minutes)</td>
<td>Kahoot! (25 minutes)</td>
<td>Multiplying Polynomials (mixed review) (8-10 minutes)</td>
<td>Written Assessment (mixed forms) (60 minutes)</td>
</tr>
<tr>
<td>TASK 2</td>
<td>Pass out progress reports (5 minutes)</td>
<td>Multiplying Binomials Worksheet (Medium) (12-15 minutes)</td>
<td>Brain Teasers (0-40 minutes)</td>
<td>Review in groups of 1-4 students (50-55 minutes)</td>
<td>None</td>
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<tr>
<td>TASK 3</td>
<td>Gradebook Clean-Up/Discussions Allow make-up assignments</td>
<td>Multiplying Binomials Worksheet (Harder) (12-15 minutes)</td>
<td>None</td>
<td>None</td>
<td>None</td>
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<td></td>
<td>(remainder of class)</td>
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<tr>
<td>Quiz</td>
<td>Make-Up Quizzes</td>
<td>Two examples</td>
<td>None</td>
<td>Mini Group Quizzes (Pull out representatives and average the scores)</td>
<td>None</td>
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<tr>
<td>(6-10 minutes)</td>
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</tr>
<tr>
<td>CLOSURE</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on today’s lesson</td>
<td>None</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on the week</td>
</tr>
<tr>
<td>(2-4 minutes)</td>
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<tr>
<td>HOMEWORK</td>
<td>Standard summary</td>
<td>Standard summary</td>
<td>None</td>
<td>Standard summary</td>
<td>None</td>
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<tr>
<td></td>
<td>Quiz (salmon sheet)</td>
<td>Notes (gold sheet)</td>
<td>Brain teasers</td>
<td>Notes (gold sheet)</td>
<td>Quiz (mini quiz)</td>
</tr>
<tr>
<td></td>
<td>Calculators</td>
<td>Quiz (tan sheet)</td>
<td>Chromebooks</td>
<td>Kahoot</td>
<td>Homework (green sheet)</td>
</tr>
<tr>
<td></td>
<td>Individual Student’s Work</td>
<td>Homework (green sheet)</td>
<td>3 Activities (worksheets)</td>
<td>Projector</td>
<td>Stickers</td>
</tr>
<tr>
<td></td>
<td>Progress Reports</td>
<td>Calculators</td>
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<tr>
<td>Vocabulary</td>
<td>None</td>
<td><strong>BOX method</strong></td>
<td>(No new)</td>
<td>(No new)</td>
<td>(No new)</td>
</tr>
</tbody>
</table>

- Calculation of scores:
- CLOSURE: Sentence reflection on today’s lesson
- HOMEWORK: Standard summary
- Materials:
  - Pink sheet
  - Salmon sheet
  - Gold sheet
  - Green sheet

- Stickers
- Calculators

- BOX method
- (No new)
<table>
<thead>
<tr>
<th>I can...</th>
<th>I can add, subtract, and multiply polynomials.</th>
<th>I can add, subtract, and multiply polynomials.</th>
<th>I can add, subtract, and multiply polynomials.</th>
<th>I can add, subtract, and multiply polynomials.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will...</td>
<td>I will be able to multiply polynomials.</td>
<td>I will be able to multiply polynomials.</td>
<td>I will be able to multiply polynomials.</td>
<td>I will be able to add, subtract, and multiply polynomials.</td>
</tr>
<tr>
<td>CC Standards</td>
<td>HSA-APR.A.1. Understand that polynomials form a system analogous to the integers, namely,</td>
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<td>HSA-APR.A.1. Understand that polynomials form a system analogous to the integers, namely,</td>
</tr>
<tr>
<td>they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
<td>closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
<td>closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
<td>they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
<td>they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
</tr>
</tbody>
</table>
Multiplying Monomials and Polynomials

Simplify each expression.

1) \((r + 9) (r + 7)\)

2) \((x - 5) (x - 3)\)

3) \((c - 4) (c + 7)\)

4) \((n + 4) (n + 6)\)

5) \((d - 5) (d + 6)\)

6) \((p + 5) (p + 9)\)

7) \((x - 9) (x + 8)\)

8) \((d - 2) (d - 4)\)

9) \((g + 2) (g - 9)\)

10) \((z + 3) (z + 8)\)
**Multiply Binomials times Binomials**

Directions: Multiply the binomials using the BOX method or the FOIL method. Be sure to SIMPLIFY and put your answer in STANDARD FORM!

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ((3x - 8)(2x + 7))</td>
<td>2. ((x - 10)(4x + 2))</td>
</tr>
<tr>
<td>3. ((-4a + 3)(3a - 4))</td>
<td>4. ((9f + 1)(3f + 4))</td>
</tr>
<tr>
<td>5. ((7m + 4)(4m - 8))</td>
<td>6. ((6x + 6)(6x - 6))</td>
</tr>
<tr>
<td>7. ((6 - 3y)(2 - 8y))</td>
<td>8. ((10p + 2)(2 + 10p))</td>
</tr>
</tbody>
</table>
Multiply Binomials times Binomials

Directions: Multiply the binomials using the BOX method or the FOIL method. Be sure to SIMPLIFY and put your answer in STANDARD FORM!

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.</strong> $(5h + 1)(3 - 8h)$</td>
<td><strong>10.</strong> $(4 - 4x)(6 - 6x)$</td>
</tr>
<tr>
<td><strong>11.</strong> $(4k + 5)(7 - 5k)$</td>
<td><strong>12.</strong> $(9 - 2b)(4 - b)$</td>
</tr>
</tbody>
</table>
**Multiply Binomials times Binomials**

Directions: Multiply the binomials using the BOX method or the FOIL method.

Be sure to **Simplify** and put your answer in **STANDARD FORM**!

1. \((x^2 - 8)(2x^2 + 3)\)  
2. \((2x^2 + 1)(3x^2 - 1)\)

3. \((4f^2 + 1)(2f^2 - 3)\)  
4. \((3k^2 + 1)(5k^2 + 5)\)

5. \((2m^2 + 2)(3m^2 - 3)\)  
6. \((7p + 4)(6p^3 + 1)\)

7. \((2x^3 + x)(4x^2 - 9x)\)  
8. \((2f^8 + 3f^5)(4f^4 + 5f)\)

9. \((6g + 1)(3g^2 - g)\)  
10. \((4x^3 - 9x)(9x^2 - 2x)\)
Multiply Binomials times Binomials

Directions: Multiply the binomials using the BOX method or the FOIL method.

Be sure to SIMPLIFY and put your answer in STANDARD FORM!

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>11. ((4k^3 + 8k)(6k^2 - 8k^2))</td>
<td>12. ((5y^7 + 8y^3)(y^2 - 3))</td>
</tr>
<tr>
<td>13. ((4x + 8x^2)(6x^5 - 9k^4))</td>
<td>14. ((-2p^3 - 2p^2)(7p^2 - 3p^3))</td>
</tr>
<tr>
<td>15. ((-6m^3 - 5)(-7m^6 - 2m^2))</td>
<td>16. ((10y^4 + 3y^4)(4y^2 + 10y^3))</td>
</tr>
<tr>
<td>17. ((-x^2 + 5x)(4x^4 + 2x^3))</td>
<td>18. ((3h + 6h^{10})(2h + h^2))</td>
</tr>
<tr>
<td>19. ((8g^3 - 6g^7)(3g^5 + 4g))</td>
<td>20. ((-2x^3 + 4)(-8x^2 + 5x^5))</td>
</tr>
</tbody>
</table>
Polynomial Review for Assessment on Friday, October 20th

**Topics:**

- Standard form (S.F.)
- Adding
- Degree
- Subtracting
- Leading Coefficient (L.C.)
- Mostly multiplying!
- Names

- Work in groups of 1-4 students
- Each person has at least 1 sticker
- 6 minutes per slip to review and make sure EVERYBODY knows what they are doing
- Mini-Quiz: Representative chosen at random to take a mini quiz based on the slip of paper
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Multiply $6xy^3z^4 \cdot 3x^7y$</td>
<td>2. Multiply $12a^2bc^4 \cdot -4a^3b^3c$</td>
</tr>
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<td></td>
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<tr>
<td>Degree: ________</td>
<td>Degree: ________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Multiply $3(5x + 8x^2)$</th>
<th>4. Multiply $-7(7y - 8)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>S.F.: ____________________</td>
<td>S.F.: ____________________</td>
</tr>
<tr>
<td>L.C.: ________</td>
<td>L.C.: ________</td>
</tr>
<tr>
<td>Degree: ________</td>
<td>Degree: ________</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Multiply $4x(-8x + 10x^6)$</th>
<th>6. Multiply $-2x(3 + 5x + 6x^2)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>S.F.: ____________________</td>
<td>S.F.: ____________________</td>
</tr>
<tr>
<td>L.C.: ________</td>
<td>L.C.: ________</td>
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<tr>
<td>Degree: ________</td>
<td>Degree: ________</td>
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<tr>
<td>Name: _____________________</td>
<td>Name: _____________________</td>
</tr>
</tbody>
</table>
7. Multiply \((g + 5)(g - 8)\)

\[ \text{S.F.: } \quad \text{L.C.: } \quad \text{Degree: } \]

8. Multiply \((k + 4)(k - 4)\)

\[ \text{S.F.: } \quad \text{L.C.: } \quad \text{Degree: } \]

9. Multiply \((3x^3 + 9)(5x + 2)\)

\[ \text{S.F.: } \quad \text{L.C.: } \quad \text{Degree: } \]

10. Multiply \((4x^7 - 1)(3x + 9)\)

\[ \text{S.F.: } \quad \text{L.C.: } \quad \text{Degree: } \]

11. Multiply \((x + 4x^2 + 3)(x - 3x^2 + 6)\)

\[ \text{S.F.: } \quad \text{L.C.: } \quad \text{Degree: } \]

12. Multiply \((9 - 3k + k^4)(2k + 16 - k^2)\)

\[ \text{S.F.: } \quad \text{L.C.: } \quad \text{Degree: } \]
<table>
<thead>
<tr>
<th></th>
<th>Add or Subtract</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Add ((5x + 4) + (2x + 8))</td>
<td>14.</td>
</tr>
<tr>
<td></td>
<td>S.F.: ________________</td>
<td>S.F.: ________________</td>
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<tr>
<td></td>
<td>L.C.: __________</td>
<td>L.C.: __________</td>
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<td></td>
<td>Degree: _________</td>
<td>Degree: _________</td>
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<td></td>
<td>Name: ________________</td>
<td>Name: ________________</td>
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<tr>
<td>15.</td>
<td>Subtract ((14c - 2) - (10c + 5))</td>
<td>16.</td>
</tr>
<tr>
<td></td>
<td>S.F.: ________________</td>
<td>S.F.: ________________</td>
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<tr>
<td></td>
<td>L.C.: __________</td>
<td>L.C.: __________</td>
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<td></td>
<td>Degree: _________</td>
<td>Degree: _________</td>
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<tr>
<td></td>
<td>Group Representative</td>
<td>Score</td>
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<tr>
<td>---</td>
<td>----------------------</td>
<td>-------</td>
</tr>
<tr>
<td>1.</td>
<td>Multiply $2x^2y^3 \cdot 6xy^2z^4$</td>
<td></td>
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<tr>
<td></td>
<td>Degree: _________</td>
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</tr>
<tr>
<td>2.</td>
<td>Multiply $4(5a^2 + 7a)$</td>
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<tr>
<td></td>
<td>S.F.: ____________________________</td>
<td></td>
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<td></td>
<td>L.C.: _________</td>
<td></td>
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<td></td>
<td>Degree: _______</td>
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<tr>
<td>3.</td>
<td>Multiply $2x^3(2 - 4x^2)$</td>
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<td></td>
<td>S.F.: ____________________________</td>
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<td></td>
<td>L.C.: _________</td>
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<tr>
<td></td>
<td>Degree: ________</td>
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<tr>
<td></td>
<td>Name: _____________________</td>
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<tr>
<td>4.</td>
<td>Multiply $(k - 6)(k + 9)$</td>
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<tr>
<td></td>
<td>S.F.: ____________________________</td>
<td></td>
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<td></td>
<td>L.C.: _________</td>
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<tr>
<td></td>
<td>Degree: ________</td>
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<tr>
<td>Question</td>
<td>Expression</td>
<td>S.F.</td>
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<tr>
<td>----------</td>
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</tr>
<tr>
<td>5. Multiply $(4a^3 - 4)(5a - 8)$</td>
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<tr>
<td>6. Multiply $(2x + x^3 + 7)(x - 3x^2 + 1)$</td>
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<tr>
<td>7. Add $(10x - 4) + (6x + 8)$</td>
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<tr>
<td>8. Subtract $(37g + 7) - (16g - 24)$</td>
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</tbody>
</table>
Polynomials Assessment Crossword Puzzle
October 20th, 2017

**WORD BANK**

- Algebraic Expression
- Binomial
- Box Method
- Coefficient
- Degree
- Distributive Property
- Exponent
- Leading Coefficient
- Monomial
- Polynomial
- Trinomial

<table>
<thead>
<tr>
<th>ACROSS</th>
<th>DOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>2: 2 terms</td>
<td>1: numbers, letters, operations</td>
</tr>
<tr>
<td>3: total value of exponents for a term</td>
<td>4: little number above</td>
</tr>
<tr>
<td>7: 4+ terms</td>
<td>5: letter that represents an unknown number</td>
</tr>
<tr>
<td>8: 1 term</td>
<td>6: number in front of the variable</td>
</tr>
<tr>
<td>9: outside times each term inside</td>
<td>11: first, outside, inside, last</td>
</tr>
<tr>
<td>10: first coefficient in standard form</td>
<td>12: 3 terms</td>
</tr>
<tr>
<td>13: organizing multiplication by drawing boxes</td>
<td></td>
</tr>
</tbody>
</table>
Polynomials Assessment Crossword Puzzle

October 20th, 2017

ACROSS
6: first coefficient in standard form
10: 1 term
12: first outside, inside, last
13: outside times each term inside

DOWN
1: 4+ terms
2: organize multiplication by drawing boxes
3: numbers, letters, operations
4: letter that represents an unknown number
5: number in front of the variable
7: 3 terms
8: 2 terms
9: little number above
11: total value of exponents for a term
Add the following polynomials. Put your answer in STANDARD FORM (S.F.)

Note: **S.F.** stands for standard form and **L.C.** stands for leading coefficient

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. ((4x^2 + 1) + (7x^2 + 10))</td>
<td>2. ((-6x - 9) + (2x - 5))</td>
<td></td>
</tr>
<tr>
<td>S.F.:</td>
<td>S.F.:</td>
<td></td>
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<tr>
<td>L.C.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree:</td>
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</table>

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<tr>
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</thead>
<tbody>
<tr>
<td>3. ((x + 1) + (3x - 1))</td>
<td>4. ((y^7 + 7y^3 + 6) + (-5y^3 - 8 + y))</td>
<td></td>
</tr>
<tr>
<td>S.F.:</td>
<td>S.F.:</td>
<td></td>
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<tr>
<td>L.C.:</td>
<td></td>
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<tr>
<td>Degree:</td>
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</table>

Subtract the following polynomials. Put your answer in STANDARD FORM.

<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>5. ((5g + 8) - (g + 3))</td>
<td>6. ((4k^3 + 7k) - (8k^3 - 6k))</td>
<td></td>
</tr>
<tr>
<td>S.F.:</td>
<td>S.F.:</td>
<td></td>
</tr>
<tr>
<td>L.C.:</td>
<td></td>
<td></td>
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<tr>
<td>Degree:</td>
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<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>7. ((5f^2 + 10) - (-2f^2 + 10))</td>
<td>8. ((4h + 12h^2 - 3) - (16h^2 - h + 9))</td>
<td></td>
</tr>
<tr>
<td>S.F.:</td>
<td>S.F.:</td>
<td></td>
</tr>
<tr>
<td>L.C.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree:</td>
<td></td>
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</tr>
</tbody>
</table>
9. Write exponents in the squares to make the polynomials have the given degree.

<table>
<thead>
<tr>
<th>Degree: 8</th>
<th>Degree: 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>$a \quad b \quad c$</td>
<td>$6x \quad z - 7x \quad y \quad z$</td>
</tr>
</tbody>
</table>

10. Write numbers in the squares to make the polynomials have the given leading coefficient. NOTE—these polynomials may not be written in standard form, so be careful where you put the *leading* coefficient.

<table>
<thead>
<tr>
<th>Leading Coefficient: 4</th>
<th>Leading Coefficient: 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\square x^2 + \square x^9 + \square x^4$</td>
<td>$8 + \square b^3 + \square b$</td>
</tr>
</tbody>
</table>

Multiply the following polynomials. Put your answer in STANDARD FORM.

<table>
<thead>
<tr>
<th>11. $x^4 \cdot x^5$</th>
<th>12. $4y^4 \cdot -3y^8$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$13. 6a^2b^5 \cdot 4a^7b$</td>
<td>$14. 7x^4y^3z^3 \cdot -5x^4y^4z^2$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree: _______</th>
<th>Degree: _______</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>15. $2x(3x + 1)$</th>
<th>16. $-2x^4(3x^2 - 7x)$</th>
</tr>
</thead>
</table>

<p>| S.F.: ___________________ | S.F.: ___________________ |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>17. $(g + 2)(g + 3)$</td>
<td>18. $(k - 1)(k^5 - 5k)$</td>
</tr>
<tr>
<td>S.F.: __________________________</td>
<td>S.F.: __________________________</td>
</tr>
<tr>
<td>L.C.: _________</td>
<td>L.C.: _________</td>
</tr>
<tr>
<td>Degree: ________</td>
<td>Degree: ________</td>
</tr>
<tr>
<td>19. $(6y + 10)(2y^7 + 1)$</td>
<td>20. $(9x - 3)(-4x + 7)$</td>
</tr>
<tr>
<td>S.F.: __________________________</td>
<td>S.F.: __________________________</td>
</tr>
<tr>
<td>21. $(6g^2 + g)(5g^2 + 2g + 3)$</td>
<td>22. $(-4y^3 + 7)(y^4 + 2y^2 - 4y)$</td>
</tr>
<tr>
<td>S.F.: __________________________</td>
<td>S.F.: __________________________</td>
</tr>
<tr>
<td>L.C.: _________</td>
<td>L.C.: _________</td>
</tr>
<tr>
<td>Degree: ________</td>
<td>Degree: ________</td>
</tr>
<tr>
<td></td>
<td>Expression</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>23.</td>
<td>$ (5x^4 + 2x^2 + 8)(9x + 3x^3 + 3) $</td>
</tr>
<tr>
<td>24.</td>
<td>$ (8g^2 + g - 4)(6g^5 - 2g^3 + 2) $</td>
</tr>
</tbody>
</table>
Add the following polynomials. Put your answer in STANDARD FORM (S.F.)

Note: S.F. stands for standard form and L.C. stands for leading coefficient

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.  $(3x^2 + 1) + (7x^2 + 2)$</td>
<td>2.  $(-8x - 1) + (2x - 7)$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.F.: __________________________</td>
<td>S.F.: __________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.C.: __________________________</td>
<td>L.C.: __________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree: __________</td>
<td>Degree: __________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subtract the following polynomials. Put your answer in STANDARD FORM.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.  $(8g + 4) - (g + 9)$</td>
<td>6.  $(2k^3 + 1) - (2k^3 - 6k)$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.F.: __________________________</td>
<td>S.F.: __________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.C.: __________________________</td>
<td>L.C.: __________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree: __________</td>
<td>Degree: __________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.  $(5f^2 + 10) - (-5f^2 + 10)$</td>
<td>8.  $(2h + 25h^2 - 3) - (12h^2 - h + 9)$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.F.: __________________________</td>
<td>S.F.: __________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.C.: __________________________</td>
<td>L.C.: __________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree: __________</td>
<td>Degree: __________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. Write exponents in the squares to make the polynomials have the given degree.

<table>
<thead>
<tr>
<th>Degree: 5</th>
<th>Degree: 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \square \ a \ \square \ b \ \square \ c )</td>
<td>( 8x \ \square \ z - 7x \ \square \ y \ \square \ z )</td>
</tr>
</tbody>
</table>

10. Write numbers in the squares to make the polynomials have the given leading coefficient. NOTE—these polynomials may not be written in standard form, so be careful where you put the leading coefficient

<table>
<thead>
<tr>
<th>Leading Coefficient: 8</th>
<th>Leading Coefficient: -12</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \square \ x^2 + \square \ x^4 + \square \ x^9 )</td>
<td>( 6 + \square \ b^3 + \square \ b )</td>
</tr>
</tbody>
</table>

Multiply the following polynomials. Put your answer in STANDARD FORM.

<table>
<thead>
<tr>
<th>11. ( g^3 \cdot g^5 )</th>
<th>12. ( 2y^8 \cdot -3y^8 )</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>13. ( 8a^2b \cdot 4a^7b^2 )</th>
<th>14. ( 7x^5y^3z^3 \cdot -2x^4y^4z^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree: _______</td>
<td>Degree: _______</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15. ( 2x(8x + 2) )</th>
<th>16. ( -8x^3(2x^2 - 4x) )</th>
</tr>
</thead>
</table>

| S.F.: ___________________________ | S.F.: ___________________________ |
17. \((g + 4)(g + 4)\)

S.F.: __________________________

L.C.: ________

Degree: ________

18. \((k - 1)(k^2 - k)\)

S.F.: __________________________

L.C.: ________

Degree: ________

19. \((2y + 12)(2y^2 + 1)\)

S.F.: __________________________

20. \((4x - 3)(-3x - 8)\)

S.F.: __________________________

19. \((2y + 12)(2y^2 + 1)\)

S.F.: __________________________

L.C.: ________

Degree: ________

20. \((4x - 3)(-3x - 8)\)

S.F.: __________________________

L.C.: ________

Degree: ________

21. \((2g^2 + g)(5g^2 + 5g + 5)\)

S.F.: __________________________

L.C.: ________

Degree: ________

22. \((y^3 + 3)(-2y^4 + 2y^2 - 5y)\)

S.F.: __________________________

L.C.: ________

Degree: ________
<table>
<thead>
<tr>
<th>Equation</th>
<th>S.F.</th>
<th>L.C.</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. $(5x^4 + 2x^2 + 1)(x + 3x^3 + 3)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. $(3g^4 + g - 2)(g^2 - 2g^4 + 2)$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Week 8
MATERIAL
LESSON PLAN WEEK OF 10/23/17

Unit 2: Polynomials

Target Skills

Day 2 Skill: Dividing Polynomials Part 1 (Polynomials by Monomials)

Day 3/4 Skill: Long Division of Polynomials Part 2 (Polynomials by Polynomials)
<table>
<thead>
<tr>
<th></th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARM-UP</td>
<td><strong>Type I:</strong> Standard form, degree, leading coefficient</td>
<td><strong>Type I:</strong> What do you do with exponents when add, subtract, multiply?</td>
<td><strong>Type I:</strong> Divide Poly by Monomial</td>
<td><strong>Type I:</strong> Which do you prefer—fruits or veggies?</td>
<td><strong>Type II:</strong> Poly divided by mono and degree</td>
</tr>
<tr>
<td>(5 minutes)</td>
<td></td>
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</tr>
<tr>
<td>NOTES</td>
<td><strong>Review add, subtract, multiply polynomials</strong></td>
<td><strong>Dividing Polynomials by Monomials</strong></td>
<td><strong>Dividing Polynomials by Binomials</strong></td>
<td><strong>Dividing Polynomials Review</strong></td>
<td><strong>None</strong></td>
</tr>
<tr>
<td>(8-10 minutes)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>TASK 1</td>
<td><strong>Group Practice Adding (Verbal Directions)</strong></td>
<td><strong>Dividing Monomials by Monomials (12-15 minutes)</strong></td>
<td><strong>Guided Practice (4 problems) (15 minutes)</strong></td>
<td><strong>Dividing by Monomials (10-15 minutes)</strong></td>
<td><strong>Written Assessment (mixed forms) (60 minutes)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>With mini quiz (15-20 minutes)</strong></td>
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<tr>
<td>TASK 2</td>
<td><strong>Group Practice Subtract (Verbal Directions)</strong></td>
<td><strong>Dividing Binomials by Monomials (12-15 minutes)</strong></td>
<td><strong>20 Problem Practice (40 minutes)</strong></td>
<td><strong>Dividing by Binomials (45 minutes)</strong></td>
<td><strong>None</strong></td>
</tr>
<tr>
<td></td>
<td><strong>With mini quiz (15-20 minutes)</strong></td>
<td></td>
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</tr>
<tr>
<td>TASK 3</td>
<td><strong>Group Practice Multiply (Verbal Directions)</strong></td>
<td><strong>Dividing Polynomials by Monomials (12-15 minutes)</strong></td>
<td><strong>None</strong></td>
<td><strong>None</strong></td>
<td><strong>None</strong></td>
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<tr>
<td></td>
<td>With mini quiz (15-20 minutes)</td>
<td>Quiz (6-10 minutes)</td>
<td>Through activity</td>
<td>4-5 examples</td>
<td>2 examples</td>
</tr>
<tr>
<td>--------------------------------</td>
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</tr>
<tr>
<td>CLOSURE (2-4 minutes)</td>
<td>Clean-Up</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on today’s lesson</td>
<td>Clean-Up</td>
<td>Sentence reflection on the week</td>
</tr>
<tr>
<td>HOMEWORK</td>
<td>None</td>
<td>Standard summary</td>
<td>Standard summary</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Materials</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Calculators</td>
<td>• Notes (gold sheet)</td>
<td>• Notes (gold sheet)</td>
<td>• Notes (gold sheet)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Long paper</td>
<td>• Worksheets (4)</td>
<td>• Guided Worksheet</td>
<td>• Divide by monos worksheet</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Quiz sheet (tan sheet)</td>
<td>• 20-Question Kuta worksheet</td>
<td>• 40-question Kuta worksheet</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Homework sheet (green sheet)</td>
<td>• Quiz sheet (tan sheet)</td>
<td>• Calculators</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Calculators</td>
<td>• Homework sheet (green sheet)</td>
<td>• Calculators</td>
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<td></td>
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<td></td>
<td>• Calculators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocabulary</td>
<td>• <strong>Dividend</strong></td>
<td>(No new)</td>
<td>(No new)</td>
<td>(No new)</td>
<td>(No new)</td>
</tr>
<tr>
<td></td>
<td>• <strong>Divisor</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>I can...</td>
<td>• Quotient</td>
<td>• Divisor</td>
<td>• Divisor</td>
<td>• Divisor</td>
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<td>-----------</td>
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<td></td>
</tr>
<tr>
<td>I will...</td>
<td>• I will be able to add, subtract, and multiply polynomials.</td>
<td>• I will be able to divide polynomials.</td>
<td>• I will be able to divide polynomials.</td>
<td>• I will be able to divide polynomials.</td>
<td></td>
</tr>
<tr>
<td>CC Standards</td>
<td>HSA-APR.A.1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
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<td></td>
</tr>
</tbody>
</table>
Example Verbal Directions for Review

Directions were given to group leaders. The review covered adding polynomials, subtracting polynomials, and multiplying polynomials.

Adding:

“Group leaders, create an addition problem for your group where the first item is a trinomial and the second item is a binomial.”

Subtracting:

“Group leaders, create a subtraction problem for your group where the first item is a binomial and the second item has at least one negative term.”

Multiplying:

“Group leaders, create a multiplication problem for your group where the first item is a binomial and the second item is a binomial with at least one negative term.”
October 24th: Dividing Monomials by Monomials

Remember:
- **Divide** coefficients by coefficients
- **Divide** variables by the same variables
- **Subtract** exponents of the same letter

Example:
\[
\frac{10x^4y^7}{5x^3y^4} = \frac{10}{5} \frac{x^4}{x^3} \frac{y^7}{y^4} = \frac{2}{1} \frac{x^{4-3}}{y^{7-4}} = 2x^1y^3
\]

1. \(\frac{6x^2}{3x}\)
2. \(\frac{48w^3}{8w}\)
3. \(\frac{35x^7}{7x^4}\)
4. \(\frac{8x^4y^5}{4x^2y^3}\)
5. \(\frac{15a^3b^3}{3ab^2}\)
6. \(\frac{10x^7y^3z^5}{5x^5y^2z^3}\)
7. \(\frac{25v^8}{5v^4}\)
8. \(\frac{90k^3}{9k^2}\)
9. \(\frac{100f^5}{10f^3}\)
10. \(\frac{24g^4h^9}{3h^3}\)
11. \(\frac{81x^3y^5}{9x^2y^4}\)
12. \(\frac{144a^8}{12a^5}\)
October 24<sup>th</sup>: Dividing Monomials by Monomials

<table>
<thead>
<tr>
<th></th>
<th>13. ( \frac{4g^3}{4g^3} )</th>
<th>14. ( \frac{36k^5h^8}{9k^3h^4} )</th>
<th>15. ( \frac{20x^4y^6}{5x^3} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.</td>
<td>( \frac{24x^8y^3}{6x^2y^2} )</td>
<td>17. ( \frac{17x^4}{17x^2} )</td>
<td>18. ( \frac{16h^7k^7}{8h^6k^3} )</td>
</tr>
<tr>
<td>19.</td>
<td>( \frac{200f^4g^6h^{12}}{100f^3g^9} )</td>
<td>20. ( \frac{27k^{10}j^5}{3k^8j^4} )</td>
<td>21. ( \frac{75f^5g^{16}}{5f^5g^7} )</td>
</tr>
<tr>
<td>22.</td>
<td>( \frac{39k^7h^{16}}{13k^7h^{14}} )</td>
<td>23. ( \frac{18x^{20}y^3z^{14}}{6x^{12}y^2z^8} )</td>
<td>24. ( \frac{12y^4}{3y^2} )</td>
</tr>
</tbody>
</table>
Division of Binomials by Monomials

1. \((6x^2 + 2xy) \div 2x = \) ____________

2. \((-x^3y + 5xy) \div (-xy) = \) ____________

3. \((3a^3bc - 9ab^2c) \div 3abc = \) ____________

4. \((2a^3b^2 - 10ab^3c) \div 2ab^2 = \) ____________

5. \((-uv^2w + 2u^3v) \div uv = \) ____________

6. \((6xy^2 + 2xz) \div 2x = \) ____________

7. \((uvw - v^2w) \div (-vw) = \) ____________

8. \((5ax^2 + 15a^3x) \div 5ax = \) ____________

9. \((6y^3z - 2y^2z^2) \div 2y^2z = \) ____________

10. \((u^3v - uv^3) \div uv = \) ____________
Division of polynomials by Monomials

1. \(12x^4y^3z^2w \div 2xy^2\) = 

2. \((2a^3b^2 - 10ab^3c) \div 2ab^2\) = 

3. \((xy^3z - 4y^2z + 6xyz - y^3z) \div yz\) = 

4. \(12y^3z \div 6y^3\) = 

5. \((6ab^4c - 3a^3bc^2 + 2a^3bc - 4ab^3c) \div abc\) = 

6. \((2r^2s^3t + 2s^3t^2 + rs^4t^3) \div s^2t\) = 

7. \((2ax^3 + 4bx) \div 2x\) = 

8. \((8uv + 10uv^2w - 8uvw) \div 2uv\) = 

9. \((4xyz + 12xyz^2 - 6xy^2 + 12x^3yz) \div 2xy\) = 

10. \((5ax^2 + 15a^3x) \div 5ax\) = 

**Division of polynomials**

1. \((x^4y - 2x^3y - x^3y^2z + x^4y^2z) ÷ x^2y\) = ________________

2. \((15a^3b + 3a^2b - 6a^2b^3 - 12a^2bc^2) ÷ 3a^2b\) = ________________

3. \((xy^3z - 4y^2z + 6xyz - y^3z + yz) ÷ (-yz)\) = ________________

4. \((x^3y - 2xy + xy^2 + x^4yz - 8xy^3) ÷ xy\) = ________________

5. \((6ab^4c - 3a^3bc^2 + 2a^3bc - 4ab^3c) ÷ abc\) = ________________

6. \((-2p^2qr^2 - 2pq^2r^3 - 3pq^4r^2 + 5pqr^2) ÷ pqr^2\) = ________________

7. \((-r^3s^4t + 2r^2s^3t + 6s^3t^2 + rs^4t^3) ÷ s^2t\) = ________________

8. \((10xy^3z - 2y^3z + 4y^2z^3 + 6xy^3z^2) ÷ 2y^2z\) = ________________

9. \((4xyz + 12xyz^2 - 6xy^2 + 12x^3yz) ÷ 2xy\) = ________________

10. \((4u^4vw + 8uv + 10uv^2w - 8uvw) ÷ 2uv\) = ________________
Steps

1. Standard Form
2. Set up \[ \text{Divisor} \div \text{Dividend} \]
3. Divide 1st term inside by the 1st term outside
4. Multiply answer by outside
5. Subtract (switch signs)
6. Drop next term

Repeat steps 3 through 5
EXAMPLE 1

\[
48876 \div 6
\]

\[
\begin{array}{c}
8146 \\
6 \overline{48876} \\
-48 \\
-8 \\
27 \\
-24 \\
36
\end{array}
\]

EXAMPLE 2

\[
(x^2 + 3x + 2) \div (x + 2)
\]

\[
\begin{array}{c}
\frac{x+1}{x+2} \\
x+2 \left| \begin{array}{c}
x^2+3x+2 \\
-x^2-2x \\
-x+2 \\
-1x-2
\end{array} \right.
\end{array}
\]

\[
\frac{x^2}{x^1} = x
\]

\[
\frac{1x}{1x} = 1
\]

EXAMPLE 3
Guided Practice—October 25th
Dividing Polynomials by Binomials

1. \( \frac{x^2 + 8x + 15}{x + 5} \)

2. \( \frac{x^2 + 3x + 2}{x + 2} \)
3. \( \frac{x^2 + x - 12}{x - 3} \)

4. \( \frac{x^2 - 10x + 24}{x - 4} \)
October 25th Dividing Trinomials by Binomials

Divide.

1) \((4x^2 - 4x - 8) ÷ (x + 1)\) 

2) \((2x^2 - 24x + 64) ÷ (x - 8)\)

3) \((7n^2 + 40n + 25) ÷ (n + 5)\)

4) \((8x^2 - 5x - 3) ÷ (x - 1)\)

5) \((9x^2 - 12x - 12) ÷ (x - 2)\)

6) \((2p^2 + 19p + 9) ÷ (p + 9)\)

7) \((8p^2 - 33p + 4) ÷ (p - 4)\)

8) \((5r^2 + 29r - 42) ÷ (r + 7)\)

9) \((2x^2 - 9x + 4) ÷ (x - 4)\)

10) \((3r^2 - 25r - 18) ÷ (r - 9)\)
11) \((3p^2 + 20p - 7) ÷ (p + 7)\)  
12) \((10m^2 - 38m - 8) ÷ (m - 4)\)

13) \((6x^2 - 40x + 50) ÷ (x - 5)\)  
14) \((5x^2 + 16x - 16) ÷ (x + 4)\)

15) \((5b^2 - 26b - 24) ÷ (b - 6)\)  
16) \((8a^2 - 43a + 15) ÷ (a - 5)\)

17) \((10x^2 + 37x - 12) ÷ (x + 4)\)  
18) \((4k^2 - 11k - 45) ÷ (k - 5)\)

19) \((10x^2 + 85x - 45) ÷ (x + 9)\)  
20) \((7v^2 + 79v + 90) ÷ (v + 10)\)
Dividing by Monomials

Name: ________________________

\[36x^3 \div 6x^2\]  \[18x^3 y^7 \div x^2 y^2\]

\[20x^6 \div 5x^2\]  \[4x^3 y^{19} \div 2x^2 y^{15}\]

\[10x^9 y^4 \div 2x^7 y^2\]  \[4x^3 \div 2x^2\]

\[72x^{14} y^{10} \div 9x^5 y^4\]  \[-16x^5 \div 8x^2\]

\[54x^8 \div 6x^4\]  \[-14x^9 y^6 \div 7x^3 y^3\]

\[81x^6 \div 9x^3\]  \[18x^7 y^3 \div -9x^5 y\]

\[25x^6 y^{14} \div 5x^6 y^2\]  \[28x^{12} \div -7x^{10}\]

\[100x^8 y^8 \div 20x^7 y^4\]  \[-8x^{18} \div 4x^{13}\]

\[-44x^3 \div 11x^2\]  \[16x^8 \div 4x^3\]

\[-30x^7 \div 6x^2\]  \[12x^{11} \div 3x^4\]

\[10x^3 y^2 \div 5x^2\]  \[10x^3 y^5 \div 2x^2 y^2\]

\[12x^3 y^4 \div 3y^2\]  \[-18x^3 y^{8}z \div 6x^2 z\]
Dividing by Monomials

\((-16x^7 + 8x^6 + 4x^3) \div 2x^2\) \quad \((9x^7 - 3x^6 + 6x^3) \div 3x^2\)

\((20x^9 + 10x^6 + 30x^3) \div 5x^2\) \quad \((14x^7 + 18x^6 + 12x^3) \div 2x^2\)

\((32x^{12} + 8x^8 - 16x^6) \div 8x^4\) \quad \((33x^{10} + 27x^4 + 9x^3) \div 3x^2\)

\((36x^{10} - 9x^6 + 27x^3) \div 3x\) \quad \((-12x^7 + 8x^6 - 2x^3) \div 2x^2\)

\((5x^7 + 35x^6 + 15x^4) \div 5x^2\) \quad \((24x^3 - 8x^2 + 4x) \div 4x\)

\((22x^8 + 55x^5 + 99x^4) \div 11x^2\) \quad \((10x^6 - 25x^5 + 50x^3) \div 5x^2\)

\((2x^{10} + 4x^9 - 4x^8) \div 2x^2\) \quad \((-21x^9 + 7x^6 + 7x^5) \div -7x^4\)
Algebra 2

Assignment

Divide.

1) \((4r^2 + 2r - 20) \div (r - 2)\)
2) \((9m^2 - 10m + 1) \div (m - 1)\)

3) \((5x^2 + 31x - 28) \div (x + 7)\)
4) \((3x^2 + 29x + 18) \div (x + 9)\)

5) \((b^2 + 18b + 80) \div (b + 10)\)
6) \((6b^2 - 45b - 24) \div (b - 8)\)

7) \((8x^2 - 29x + 15) \div (x - 3)\)
8) \((7a^2 + 65a - 50) \div (a + 10)\)

9) \((7k^2 + 45k + 50) \div (k + 5)\)
10) \((8n^2 + 53n + 30) \div (n + 6)\)

11) \((5n^2 - 38n + 21) \div (n - 7)\)
12) \((4n^2 + 18n - 70) \div (n + 7)\)

13) \((10n^2 + 52n + 10) \div (n + 5)\)
14) \((6r^2 - 20r - 50) \div (r - 5)\)

15) \((7v^2 - 9v + 2) \div (v - 1)\)
16) \((6x^2 + 63x + 81) \div (x + 9)\)

17) \((4n^2 - 23n - 6) \div (n - 6)\)
18) \((7n^2 + 22n + 3) \div (n + 3)\)

19) \((8x^2 - 10x + 2) \div (x - 1)\)
20) \((5n^2 + 12n - 32) \div (n + 4)\)

21) \((n^3 - 7n^2 - 33n + 30) \div (n - 10)\)
22) \((n^3 + 3n^2 - 28n + 30) \div (n - 3)\)

23) \((x^3 - x^2 - 28x + 40) \div (x - 5)\)
24) \((8x^3 + 71x^2 - 92x - 20) \div (x + 10)\)

Created with Kuta Software
25) \( (x^3 - 8x^2 - 17x - 8) \div (x + 1) \) 
26) \( (v^3 + v^2 + v - 3) \div (v - 1) \)

27) \( (n^3 + 18n^2 + 78n - 27) \div (n + 9) \) 
28) \( (a^3 - a^2 - 29a - 6) \div (a - 6) \)

29) \( (m^3 + 15m^2 + 51m - 35) \div (m + 7) \) 
30) \( (n^3 - 13n^2 + 37n - 21) \div (n - 3) \)

31) \( (10x^3 - 19x^2 - 9x + 14) \div (x - 2) \) 
32) \( (v^3 + 13v^2 + 37v + 21) \div (v + 3) \)

33) \( (n^3 - 2n^2 - 57n + 42) \div (n + 7) \) 
34) \( (3r^3 + 29r^2 + 42r + 16) \div (r + 8) \)

35) \( (10x^3 - 87x^2 - 17x - 90) \div (x - 9) \) 
36) \( (5v^3 + 2v^2 + 3v + 6) \div (v + 1) \)

37) \( (5p^3 - 40p^2 - 94p - 60) \div (p - 10) \) 
38) \( (n^3 - 15n^2 + 51n + 35) \div (n - 7) \)

39) \( (5p^3 - 12p^2 + p + 6) \div (p - 2) \) 
40) \( (2n^3 - 27n^2 + 79n + 18) \div (n - 9) \)
## Assessment—October 27th

### Part 1: Dividing by Monomials

100 points

Divide:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. $10x^{10} \div 5x^2 =$</td>
<td>2. $9x^5 \div 3x^3 =$</td>
<td></td>
</tr>
<tr>
<td>3. $8x^4 \div 4x^2 =$</td>
<td>4. $30x^2y^7 \div 6x^2y^4 =$</td>
<td></td>
</tr>
<tr>
<td>5. $18x^3 \div -3x^3 =$</td>
<td>6. $16g^3f^8 \div 4g^3f^3 =$</td>
<td></td>
</tr>
<tr>
<td>7. $(21x^5 + 9x^4 + 36x^3) \div 3x^3 =$</td>
<td>8. $25y^{10} \div 5y^7 =$</td>
<td></td>
</tr>
<tr>
<td>9. $-8b^8 \div 4b^2 =$</td>
<td>10. $(8x^8 + 12x^4 + 16x^3) \div 4x^3 =$</td>
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</tr>
<tr>
<td><strong>11.</strong> $14x^5y'z^4 ÷ -7x^3y^3z^2 =$</td>
<td><strong>12.</strong> $-81x^2y'z ÷ -9x^4y^4 =$</td>
<td></td>
</tr>
<tr>
<td><strong>13.</strong> $9a^4b^4 ÷ 3a^2b^2 =$</td>
<td><strong>14.</strong> $45x^9y^4 ÷ -5x^5y^3 =$</td>
<td></td>
</tr>
<tr>
<td><strong>15.</strong> $(-45a^8 + 9a^3 + 27a^2) ÷ 9a =$</td>
<td><strong>16.</strong> $7x^2 ÷ 7x^2 =$</td>
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</tr>
<tr>
<td><strong>17.</strong> $40m^7 ÷ 10m^4 =$</td>
<td><strong>18.</strong> $12x^8y^2 ÷ 4x^5 =$</td>
<td></td>
</tr>
<tr>
<td><strong>19.</strong> $(90a^7b^5c^7 + 10a^4b^3c - 50a^6b^8c^3) ÷ -10a^2b^4c =$</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>20.</strong> $(6x^8y^5 + 24x^4y^9 + 18x^3y^4) ÷ 3x^3y^2 =$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Assessment—October 27th**
Part 1: *Dividing by Monomials*

100 points

<table>
<thead>
<tr>
<th>Divide:</th>
<th>1. $12x^{10} ÷ 6x^7 =$</th>
<th>2. $81x^6 ÷ 9x^7 =$</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. $(21x^5 + 9x^4 + 36x^3) ÷ 3x^3 =$</td>
<td>4. $42x^6y^6 ÷ 6x^2y^4 =$</td>
<td></td>
</tr>
<tr>
<td>5. $(8x^8 + 12x^4 + 16x^3) ÷ 4x^3 =$</td>
<td>6. $16g^9f^8 ÷ 8g^3f^3 =$</td>
<td></td>
</tr>
<tr>
<td>7. $8x^{10}y^7 ÷ 4x^2 =$</td>
<td>8. $25y^7 ÷ 5y^7 =$</td>
<td></td>
</tr>
<tr>
<td>9. $8b^3 ÷ -4b^2 =$</td>
<td>10. $18x^8 ÷ -3x^5 =$</td>
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</tr>
<tr>
<td>11.</td>
<td>(28x^6y^5z^4 \div -7x^3y^3z^2 = )</td>
<td>12.</td>
</tr>
<tr>
<td>13.</td>
<td>(9a^4b^4 \div -3a^2b^2 = )</td>
<td>14.</td>
</tr>
<tr>
<td>15.</td>
<td>(7x^2 \div 7x^2 = )</td>
<td>16.</td>
</tr>
<tr>
<td>17.</td>
<td>(40m^7 \div 10m^4 = )</td>
<td>18.</td>
</tr>
<tr>
<td>19.</td>
<td>((30a^7b^5c^7 - 50a^4b^8c + 10a^5b^8c^3) \div -10a^2b^4c = )</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>((6x^7y^5 + 24x^8y^2 + 18x^3y^4) \div 3x^3y^2 = )</td>
<td></td>
</tr>
</tbody>
</table>
**Assessment—October 27th**

**Part 1: Dividing by Monomials**

100 points

Divide:

1. \(14x^{10} \div 7x^9 = \)

2. \(4x^9 \div 2x^7 = \)

3. \(45y^9 \div 5y^7 = \)

4. \(48x^9y^6 \div 6x^5y^4 = \)

5. \((12x^8 + 8x^7 + 16x^4) \div 4x^3 = \)

6. \(16g^5f^3 \div 8g^3f^3 = \)

7. \(28x^6y^7 \div 4x^2 = \)

8. \((21x^9 + 9x^4 + 36x^3) \div 3x^3 = \)

9. \(-8b^2 \div 4b^2 = \)

10. \(28x^6y^5z^4 \div -7x^3y^3z^2 = \)
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11. (-18x^8 \div 9x^5 =)</td>
<td>12. (36x^2y^8z \div 4x^2y^4 =)</td>
<td></td>
</tr>
<tr>
<td>13. (-9a^4b^4 \div -3a^2b^2 =)</td>
<td>14. (-45x^6y^4 \div 5x^5y^3 =)</td>
<td></td>
</tr>
<tr>
<td>15. (7x^2 \div 7x^2 =)</td>
<td>16. ((-45a^8 + 9a^3 + 18a^2) \div 9a =)</td>
<td></td>
</tr>
<tr>
<td>17. (30m^7 \div 10m^5 =)</td>
<td>18. (12x^8y^2 \div 4x^5 =)</td>
<td></td>
</tr>
<tr>
<td>19. ((-70a^2b^5c^7 + 10a^4b^3c + 50a^6b^8c^3) \div -10a^2b^4c =)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. ((24x^7y^5 + 6x^8y^2 + 18x^3y^4) \div 3x^3y^2 =)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Assessment—October 27th
Part 1: Dividing by Monomials
100 points

Divide:

1. \(-14x^{10} \div 7x^{9} =\)

2. \((12x^{8} + 8x^{7} + 16x^{4}) \div 4x^{3} =\)

3. \(36x^{16}y^{6} \div 6x^{10}y^{4} =\)

4. \(10y^{9} \div 5y^{7} =\)

5. \(4x^{9} \div 2x^{7} =\)

6. \(16g^{6}f^{5} \div 8g^{3}f^{3} =\)

7. \(28x^{6} \div 4x^{2} =\)

8. \((21x^{9} + 9x^{4} + 36x^{3}) \div 3x^{3} =\)

9. \(-8ab^{2} \div 4ab^{2} =\)

10. \(-28x^{8}y^{5}z^{6} \div 4x^{3}y^{3}z^{2} =\)
<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>11.</td>
<td>$72x^8 \div 9x^5 =$</td>
<td>12.</td>
</tr>
<tr>
<td>13.</td>
<td>$9a^4b^4 \div -3a^2b^2 =$</td>
<td>14.</td>
</tr>
<tr>
<td>15.</td>
<td>$8xy^2 \div 8xy^2 =$</td>
<td>16.</td>
</tr>
<tr>
<td>17.</td>
<td>$40m^7 \div 10m^5 =$</td>
<td>18.</td>
</tr>
<tr>
<td>19.</td>
<td>$(20a^6b^5c^2 + 10a^4b^3c + 30a^6b^8c^3) \div -10a^2b^4c =$</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>$(24x^7y^5 + 6x^5y^2 + 18x^3y^4) \div 3x^3y^2 =$</td>
<td></td>
</tr>
</tbody>
</table>
Imagine that your friend is home sick and you must teach them how to divide a trinomial by a binomial using long division.

If you choose to do part 2 individually:

- You must demonstrate how to solve one problem using long division

If you choose to do part 2 with a partner:

- You must demonstrate how to solve TWO problems using long division
- Each person must be involved in the video explanation or else you lose 50% of the points!
Requirements:

• Pick up an equation from Ms. S or Ms. Church
• On a piece of paper, show how to solve the problem(s)—100 points
  o Get this approved before starting the video!!!
• Create a video
  o Content:
    ▪ Use of long division—40 points
    ▪ Correct mathematical language—20 points
    ▪ Correct step-by-step procedure—100 points
      • You must show how to use these steps:
        o Set up
        o Divide
        o Multiply
        o Subtraction (switch signs)
        o Drop the next term
        o Repeat
        o How to get “zero” at the end
        o Where the quotient is
  o Video:
    ▪ Actively show the work in the video—20 points
    ▪ Time limit—20 points
      • Individual: 2-3 minutes
      • Partnership: 3-5 minutes
    ▪ Each person must be involved in the video explanation or else you lose 50% of the points!
Week 9
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 10/30/17

Unit 2: Polynomials

Target Skills

Day 1/2 Skill: Long Division of Polynomials with a Remainder

Day 3 Skill: Multiplying and Dividing
<table>
<thead>
<tr>
<th></th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
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<tbody>
<tr>
<td>WARM-UP (5 minutes)</td>
<td>Type I: What’s your favorite candy?</td>
<td>Type II: What is the degree?</td>
<td>Type II: Multiply the monomial by a binomial</td>
<td>Type I: What is your favorite holiday?</td>
<td>No School</td>
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<td>NOTES (8-10 minutes)</td>
<td>Dividing Polynomials with Remainder</td>
<td>Dividing Polynomials with and without Remainder</td>
<td>(No New) Adding, Subtracting, Multiplying, Dividing Mix</td>
<td>Adding, Subtracting, Multiplying, Dividing Mix</td>
<td></td>
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<tr>
<td>TASK 1</td>
<td>Guided Practice 4 Questions (10-15 minutes)</td>
<td>Review Packet (45-60 minutes)</td>
<td>Assessment—Create a recipe book for polynomials (adding, subtracting, multiplying, dividing) (60 minutes)</td>
<td>Assessment—Create a recipe book for polynomials (adding, subtracting, multiplying, dividing) (65 minutes)</td>
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<td>TASK 2</td>
<td>Practice 20 Questions (kuta) (40-45 minutes)</td>
<td>Halloween Extra Credit (12-15 minutes)</td>
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<td>TASK 3</td>
<td>None</td>
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<tr>
<td>Quiz (6-10 minutes)</td>
<td>1 Question</td>
<td>Throughout activity</td>
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<td>CLOSURE (2-4 minutes)</td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on today’s lesson</td>
<td>Clean Up</td>
<td>Clean Up</td>
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<td>HOMEWORK</td>
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<td>Materials</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
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<tr>
<td></td>
<td>• Notes (gold sheet)</td>
<td>• Review Packet</td>
<td>• Assessment Guidelines</td>
<td>• Assessment Guidelines</td>
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<td></td>
<td>• Quiz sheet (tan sheet)</td>
<td>• Calculators</td>
<td>• Assessment Example</td>
<td>• Assessment Example</td>
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<td></td>
<td>• Calculators</td>
<td>• Assessment Point Distribution</td>
<td>• Chromebooks</td>
<td>• Chromebooks</td>
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<tr>
<td></td>
<td>• 3 papers</td>
<td>• Blank Paper (white and colored)</td>
<td>• Blank Paper (white and colored)</td>
<td>• Blank Paper (white and colored)</td>
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<td>• Calculators</td>
<td>• Calculators</td>
<td>• Calculators</td>
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<tr>
<td>Vocabulary</td>
<td>• Dividend</td>
<td>• Dividend</td>
<td>(No new)</td>
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<td>I can...</td>
<td>• I will be able to add, subtract,</td>
<td>• I will be able to divide</td>
<td>• I will be able to divide</td>
<td>• I will be able to divide</td>
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<td></td>
<td>and multiply polynomials.</td>
<td>polynomials.</td>
<td>polynomials.</td>
<td>polynomials.</td>
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<td>I will...</td>
<td>• I will be able to divide</td>
<td>• I will be able to divide</td>
<td>• I will be able to divide</td>
<td>• I will be able to divide</td>
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<td>polynomials.</td>
<td>polynomials.</td>
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<td>polynomials.</td>
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<td>polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.</td>
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</tbody>
</table>

Whatever you get at the end, make a fraction.

Remainder: \( \frac{\text{end } \#}{\text{divisor}} \)
EXAMPLE 1

\[
\frac{x^2 + 4x + 6}{x^2 + 4x - 6}
\]

\[
\frac{x + 1}{x + 3} - \frac{9}{x + 3}
\]

\[
\frac{x^2 + 4x - 6}{-x^2 - 3x}
\]

\[
\frac{1x - 6}{1x - 3}
\]

\[
\frac{-1x - 9}{-9}
\]

EXAMPLE 2

EXAMPLE 3
Guided Practice
Dividing Polynomials by Binomials with a Remainder

1. \((x^2 + 12x + 5) \div (x + 4)\)

2. \((x^2 + 5x - 8) \div (x + 2)\)
3. \((4x^2 - 8x + 12) \div (x - 3)\)

4. \((10x^2 + 12x + 5) \div (2x + 4)\)
Algebra 2

Assignment

Divide.

1) \((5x^2 + 46x + 38) \div (x + 8)\)

2) \((8n^2 + 67n - 48) \div (n + 9)\)

3) \((5n^2 + 42n - 17) \div (n + 9)\)

4) \((5x^2 - 41x - 42) \div (x - 9)\)

5) \((5x^2 + 48x - 14) \div (x + 10)\)

6) \((x^2 - 8x + 10) \div (x - 3)\)

7) \((7p^2 - 25p + 7) \div (p - 3)\)

8) \((10m^2 - 40m - 54) \div (m - 5)\)

9) \((-7m^2 + 70m - 66) \div (m - 9)\)

10) \((10n^2 + 98n - 26) \div (n + 10)\)
11) \((7n^2 - 8n - 4) \div (n - 1)\)  
12) \((3n^2 - 17n - 12) \div (n - 6)\)  

13) \((8r^2 - 74r + 71) \div (r - 8)\)  
14) \((-9b^2 + b + 10) \div (b - 1)\)  

15) \((9k^2 - 95k + 49) \div (k - 10)\)  
16) \((p^2 + 12p + 33) \div (p + 9)\)  

17) \((8k^2 + 40k + 26) \div (4k + 4)\)  
18) \((12x^2 + 47x + 37) \div (3x + 8)\)  

19) \((24p^2 - 80p + 53) \div (3p - 7)\)  
20) \((56a^2 - 11a - 2) \div (8a + 3)\)
Polynomials Review

This review is designed to help you prepare for this week's assessment.

1. What is the coefficient of $x$?

2. What is the degree of $x$?

3. When you add polynomials, what do you do with the exponents?

4. When you subtract polynomials, what do you do with the exponents?

5. What is $(2x^2 + 4x) + (3x^2 - 8x)$?

6. What is $(2x^2 + 4x) - (3x^2 - 8x)$?

7. Create an addition problem that adds a trinomial to a binomial.

   Solve it below.

8. Create a subtraction problem that is a trinomial minus a trinomial AND the second trinomial has 2 negative terms.

   Solve it below.
9. What is the degree of your final answer for number 7?

10. What is the leading coefficient of your final answer for number 8?

11. Arrange your answer for number 8 in standard form.
1. What do you do with coefficients when you multiply?

2. What do you do with exponents when you multiply?

3. What is $x \cdot x$?

4. What is $-6 \cdot x$?

5. What is $3x^2 \cdot 4x^3$?

6. What is $5x^2 \cdot -2x$?

7. Create a multiplication problem that is a monomial times a trinomial AND the trinomial must have at least 1 negative term.

   Solve it below.
8. Show how to get the answer to solve the following problem in any way that you choose: 
\((4x^2 + 2x)(-2x^2 - 3)\)

9. *Show how to use the box method to solve \((2x - 3)(x^2 + 2x - 1)\)
1. What do you do with **coefficients** when you *divide*?

2. What do you do with **exponents** when you *divide*?

3. What is \( \frac{x}{x} \)?

4. What is \((3x^2) \div (3x^2)\)?

5. What is \((4x^4) \div (2x^3)\)?

6. What is \((-10x^5) \div (2x^2)\)?

7. What is \((9x^3 - 6x^2 - 12x) \div (3x)\)?

8. What is \((10x^4 + 14x^3 - 6x^2) \div (-2x)\)?
9. What is \((x^2 + x - 2) \div (x + 2)\)?

10. What is \((12x^2 + 26x + 4) \div (2x + 4)\)?
11. How do you represent a remainder when you are doing division of polynomials?

12. What is \((x^2 + 7x + 10) \div (x + 4)\)?
Polynomials Assessment November 1\textsuperscript{st} - 2\textsuperscript{nd}

Recipe Booklet for Polynomials

Requirements:

- Cover
- Table of Contents
- Content:
  - Vocabulary
    - Exponents
    - Coefficients
    - Leading Coefficient
    - Degree
    - Standard form
    - Dividend
    - Divisor
  - How to add polynomials
    - What’s the “recipe”?
      - Must show what to do with the \textit{coefficients} and \textit{exponents}
    - 3 Examples
      - Must include at least one example with negative terms
      - Must include at least 2 examples with trinomials or polynomials
  - How to subtract polynomials
    - What’s the “recipe”?
      - Must show what to do with the \textit{coefficients} and \textit{exponents}
    - 3 Examples
      - Must include at least one example with negative terms
      - Must include at least 2 examples with trinomials or polynomials
  - How to multiply polynomials
    - What’s the “recipe”?
      - Must show what to do with the \textit{coefficients} and \textit{exponents}
• Box and/or FOIL method
  
  ▪ 3 Examples
  • Must include at least one example with negative terms
  • Must include at least 2 examples with trinomials or polynomials
  o How to divide polynomials
    ▪ What’s the “recipe”?
      • Must show what to do with the coefficients and exponents
      • Dividing by monomials
      • Dividing by binomials (long division)
  ▪ 3 Examples—
    • 1) dividing by a monomial
      o Must show what to do with the coefficients and exponents
      o Dividend must have more than one term
      o Must include at least one negative term
      o Must have more than one variable/letter
    • 2) dividing by a binomial without remainder
      o Must show long division
    • 3) dividing by binomial with remainder
      o Must show long division
Polynomials Assessment November 1\textsuperscript{st} - 2\textsuperscript{nd}

Recipe Booklet for Polynomials

300 Points Total

Point Values:

- Presentation (neat, organized, attractive, etc.) — 20 points
- Cover — 5 points
- Table of Contents — 10 points
- Content:
  - Vocabulary — 35 points (5 points each)
  - How to add polynomials
    - What’s the “recipe”? — 20 points
    - 3 Examples — 30 points (10 points each)
  - How to subtract polynomials
    - What’s the “recipe”? — 20 points
    - 3 Examples — 30 points (10 points each)
  - How to multiply polynomials — 30 points
    - What’s the “recipe”? — 30 points (10 points each)
  - How to divide polynomials
    - What’s the “recipe”? — 40 points
    - 3 Examples — 30 points (10 points each)
Simple Recipe Guide to Polynomials

By Ms. Sanfillippo
# Table of Contents

<table>
<thead>
<tr>
<th>Content</th>
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<td>Vocabulary</td>
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<td>Dividing Polynomials</td>
<td>8</td>
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</tbody>
</table>
Recipe for
Adding Polynomials

Ingredients

- Polynomials—monomials, binomials, trinomials, polynomials (4 terms, 5 terms, etc.)
- Plus Signs
- Equal Signs

Recipe

1. Arrange the polynomials that are being added together side by side

2. Put a plus sign between the polynomials that are being added

3. Put an equal sign at the end

4. Remove the parenthesis (you don’t need them)

5. Simplify by combining like terms
   a. ADD the coefficients of like terms together
   b. Do not change the variable or exponents

6. Put the final answer in standard form
Adding Polynomials

{Examples}

• Example 1: Add $4x^2$ and $2x^2$

$$4x^2 + 2x^2 =$$

$$4 + 2 = 6$$

$$4x^2 + 2x^2 = 6x^2$$

• Example 2: Add $(x + 1)$ and $(x + 1)$

$$(x + 1) + (x + 1) =$$

$$x + 1 + x + 1 =$$

$$2x + 2$$

• Example 3: Add $(2x^3 + 2x^2 + 2x)$ and $(2x^3 + 4x^2 + 6x)$

$$(2x^3 + 2x^2 + 2x) + (2x^3 - 4x^2 - 6x) =$$

$$2x^3 + 2x^2 + 2x + 2x^3 - 4x^2 - 6x =$$

$$4x^3 - 2x^2 - 4x$$
Week 10
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 11/6/17

Unit 2: Polynomials

Target Skills

Day 1 Skill: Prime Factorization & Greatest Common Factor

Day 2 Skill: Factoring Out Monomials

Day 3/4 Skill: Factoring Quadratics (Trinomials into Binomials)
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<tr>
<td>WARM-UP</td>
<td>Type I: If you could be anywhere else in the world, where would you be?</td>
<td>Type II: Find the GCF of the given terms</td>
<td>Type II: Factor out the monomial</td>
<td>Type I: Would you rather be poor and happy or rich and miserable?</td>
<td>Type II: Factor the trinomial into binomials</td>
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<td>Greatest Common Factor</td>
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<td>TASK 1</td>
<td>Circle all prime numbers from 1 to 20 (2-5 minutes)</td>
<td>Breakdown for factoring out monomials (15 minutes)</td>
<td>Shuffle Match GCF to binomials competition (15-25 minutes)</td>
<td>Find the Pair that Multiplies to one # and Adds/Subtracts to another (10-12 minutes)</td>
<td>Assessment Part 1 (Prime #s, Prime Factorization, GCF, Factoring) 3 Versions + Mixed pages (40-45 minutes)</td>
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<td>Prime Factorization</td>
<td>Factoring Out Polynomials (1 Variable) (15 minutes)</td>
<td>5-Page Practice (30-45 minutes)</td>
<td>Factor Quadratics with LC 1 (12-15 minutes)</td>
<td>Assessment Part 2 (15-20 minutes)</td>
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<td>• Factor Tree • Factors • Greatest Common Factor</td>
<td>• I can solve a quadratic by factoring or using the quadratic formula • I can identify the zeroes of factored polynomials.</td>
<td>HSF.IF.C.8a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</td>
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<td>• I can solve a quadratic by factoring or using the quadratic formula • I can identify the zeroes of factored polynomials.</td>
<td>• I will be able to factor out monomials and identify GCF</td>
<td>HSF.IF.C.8a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</td>
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<td>• I can solve a quadratic by factoring or using the quadratic formula • I can identify the zeroes of factored polynomials.</td>
<td>• I will be able to factor quadratics</td>
<td>HSF.IF.C.8a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</td>
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<td>• I can solve a quadratic by factoring or using the quadratic formula • I can identify the zeroes of factored polynomials.</td>
<td>• I will be able to find prime factorization and GCF • I will be able to factor out monomials • I will be able to factor quadratics</td>
<td>HSF.IF.C.8a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</td>
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<tr>
<td>HSA.SSE.B.3.A</td>
<td>Factor a quadratic expression to reveal the zeros of the function it defines.</td>
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<tr>
<td>SSE.A.2</td>
<td>Use the structure of an expression to identify ways to rewrite it. For example, see ( x^4 - y^4 ) as ( (x^2)^2 - (y^2)^2 ), thus recognizing it as a difference of squares that can be factored as ( (x^2 - y^2)(x^2 + y^2) ).</td>
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Algebra IIA Part I

Factoring Pre-Assessment

You should know some of these. If you don’t know the answer to others, that’s ok. Take your best guess.

1. What is the leading coefficient of \( x^2 + 3x + 2 \) ?

2. What is the leading coefficient of \( -7x^2 - 3x + 14 \)

3. Write the following in standard form: \( 5x + 10x^2 + 15 \)

4. What is the coefficient of the 2\(^{\text{nd}}\) term of \( 10x^2 + 4x + 40 \) ?

5. What are all the factors of: \( 12 \) ?

6. Which of the following are prime numbers? (circle all primes)

   1 3 6 7 8 9 12 13 15 17 20 21 25

7. What is the prime factorization of 32 ?
8. What is the greatest common factor of 21 and 35?

9. Find two numbers that multiply to 30 and add to 11.

   First number:
   Second number:

10. Find two numbers that multiply to 24 and add or subtract to -10.

   First number:
   Second number:

11. Factor this trinomial: \( x^2 + 3x + 2 \)

12. Factor this trinomial: \( x^2 + 1x - 12 \)
Factors: #s you multiply together to get another #

Ex: Factors of 20: 1, 2, 4, 5, 10, 20

Prime number: #s that can only be divided evenly by 1 and itself

note: 1 is NOT prime

Ex: 3, 5, 7

Prime factorization: prime #s that multiply together to make the original #

Factor tree: method for finding prime factorization

Greatest Common factor (GCF): biggest factors that terms have in common

GCF (6, 8) = 2

\[ \begin{array}{c}
1 \quad 2 \\
6 \quad 3 \\
\end{array} \quad \begin{array}{c}
1 \quad 2 \\
8 \quad 4 \\
\end{array} \]
EXAMPLE 1

Prime factorization of 32

\[ 32 \]
\[ \frac{32}{2} = 16 \]
\[ \frac{16}{2} = 8 \]
\[ \frac{8}{2} = 4 \]
\[ \frac{4}{2} = 2 \]
\[ \frac{2}{2} = 1 \]

\[ 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32 \]

EXAMPLE 2

GCF of 8, 16, 28

Find factors:

\[ 1 \]
\[ 2 \]
\[ 4 \]
\[ 8 \]
\[ 16 \]
\[ 4 \]
\[ 8 \]
\[ 28 \]
\[ 14 \]
\[ 7 \]

GCF is 4

EXAMPLE 3

GCF of \(12x^2y\), \(18x^2y^3\)

#s then letters

\[ 1 \]
\[ 2 \]
\[ 3 \]
\[ 12 \]
\[ 6 \]
\[ 4 \]
\[ 18 \]
\[ 9 \]
\[ 3 \]

\[ x \cdot x \cdot y \]
\[ x \cdot x \cdot y \cdot y \cdot y \]

GCF = \(6x^2y\)
Circle or highlight all **PRIME** numbers!

1 2 3 4 5

6 7 8 9 10

11 12 13 14 15

16 17 18 19 20
# Prime Factorization

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<td>1.</td>
<td>36</td>
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<td>3.</td>
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<td>4.</td>
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<td>6.</td>
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</table>
Greatest Common Factor—Numbers Only
State what the greatest common factor is between the given numbers.

1. 6 and 12
2. 16 and 24

3. 18 and 24
4. 8 and 6

5. −32 and 28
6. 30 and 24

7. 33 and 77
8. −18 and −28

9. 15 and 35
10. 68 and 46

11. −15 and −30
12. 116 and 612
Greatest Common Factor—Monomials

State what the greatest common factor is between the given monomials. Box your answers.

1. $x^2y^3$ and $x^4y$

2. $a^3b^3$ and $a^6b^2$

3. $m^8n^7$ and $m^4n^6$

4. $g^6h^2$ and $g^3h^7$

5. $x^4y^6z^7$ and $x^4z^8$

6. $a^2b^7c^5$ and $b^4c^3$

7. $6g^3$ and $3g^5$

8. $-8x^8$ and $-4x^4$

9. $24y^6$ and $32y^2$

10. $20m^4$ and $38m^9$
11. $10x^4y^3$ and $15x^3y^4$

12. $22m^7n^{10}$ and $18m^5n^8$

13. $21pq^4$ and $14pq^2$

14. $-81x^4y^3$ and $-27x^8$

15. $39g^3h^5k^5$ and $90g^5h^7k^8$

16. $26x^3y^7$ and $39x^9y^5$
Greatest Common Factor—Numbers Only (modified)

State what the greatest common factor is between the given numbers.

1. 6 and 12
2. 16 and 24
3. 18 and 24
4. 8 and 6
5. −32 and 28
6. 30 and 24
7. 15 and 35
8. −18 and −28
Greatest Common Factor—Monomials

State what the greatest common factor is between the given monomials. Box your answers.

1. $x^2y^3$ and $x^4y$

2. $a^3b^3$ and $a^6b^2$

3. $x^4y^6z^7$ and $x^4z^8$

4. $a^2b^7c^5$ and $b^4c^3$

5. $6g^3$ and $3g^5$

6. $-8x^8$ and $-4x^4$

7. $24y^6$ and $32y^2$

8. $20m^4$ and $38m^9$

9. $10x^4y^3$ and $15x^3y^4$

10. $22m^7n^{10}$ and $18m^5n^8$
Circle or highlight all **PRIME** numbers!

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How many did you circle? _____
Step 1: Find GCF of all terms

Step 2: Put GCF outside $GCF(\ )$

Step 3: Find what's left inside

Note: you should have the same # of terms left inside as you start with
EXAMPLE 1

Factor \(3x^8 + 6x^3\)

\[
\begin{align*}
\text{GCF} &= 3x^3 \\
&= 3x^3 (x^5 + 2)
\end{align*}
\]

EXAMPLE 2

Factor \(12a^3 - 6a^2 + 18a\)

\[
\begin{align*}
\text{GCF} &= 6a (2a^2 - a + 3)
\end{align*}
\]

EXAMPLE 3

Factor \(12x^2y^6 - 16x^4y^2\)

\[
\begin{align*}
\text{GCF} &= 4x^2y^2 (3y^4 - 4x^2)
\end{align*}
\]
## FACTORING!!!!

What would you factor out?

<table>
<thead>
<tr>
<th>Problem</th>
<th>What coefficient? (GCF of #)</th>
<th>What variable(s)? (GCF of letters)</th>
<th>What’s the final answer?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ((x^3 + x^7 + x^8))</td>
<td>1</td>
<td>(x^3)</td>
<td>(x^3)</td>
</tr>
<tr>
<td>2. ((4x^6y^2 + 6x^7y^3))</td>
<td>2</td>
<td>(x^6y^2)</td>
<td>(2x^6y^2)</td>
</tr>
<tr>
<td>3. ((3x^4 + 11x^3))</td>
<td>n/a</td>
<td>(x^3)</td>
<td>(x^3)</td>
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<tr>
<td>4. ((7y^4 + 14y^9))</td>
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<tr>
<td>5. ((6p^7 + 16p^3))</td>
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<td></td>
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<tr>
<td>6. ((-32g^3k^7 - 6g^2k^9))</td>
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<tr>
<td>7. ((-28x^6 - 6x^7))</td>
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</tr>
<tr>
<td>Problem</td>
<td>What coefficient? (GCF of #)</td>
<td>What variable(s)? (GCF of letters)</td>
<td>What’s the final answer?</td>
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<tr>
<td>8. ((-16m^7 - 6m^4 - 8m^3))</td>
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<tr>
<td>9. ((32x^9 + 30x^3))</td>
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<tr>
<td>10. ((16k^2 + 7k^3))</td>
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<tr>
<td>11. ((7g^7 + 5g^3))</td>
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<tr>
<td>12. ((18m^5n^4 + 12m^3n^2))</td>
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<tr>
<td>13. ((9x^{10} + 3x^8 + 12x^4))</td>
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<tr>
<td>14. ((30x^6y^4 + 15x^5y^4 + 25x^4))</td>
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</table>
Factoring Out Monomials

Factor out the monomial that is the greatest common factor.

Example: \((2x^2 + 6x^4) \rightarrow \text{GCF is } 2x^2 \)

\[ = 2x^2(1 + 3x^2) \]

1. \((h^5 + h^3)\)
2. \((x^2 + x^6)\)

3. \((6x^2 + 8x)\)
4. \((-12x^2 - 18x^7)\)

5. \((25y^7 + 45y^5)\)
6. \((4p^8 + 6p^4)\)

7. \((y^4 + 2y^5)\)
8. \((-3x^2 - 6x^5)\)

9. \((63x^8 + 45x^2)\)
10. \((44b^6 + 4b^5)\)
11. \((100y^2 + 25y^5)\)  
12. \((36k^5 + 9k^5)\)  
13. \((11a^6 + 3a^3)\)  
14. \((5x^5 + 30x^3)\)  
15. \((8x^4 + 10x^9)\)  
16. \((9k^6 + 15k^5 + 12k^2)\)  
17. \((2x^6 + 4x^5 + 6x^3)\)  
18. \((21y^9 + 15y^7 + 12y^2)\)  
19. \((16k^2 + 10k^3 + 8k^7)\)  
20. \((36g^3 + 18g^9 + 24g^5)\)
**Factoring Out Monomials**

Factor out the monomial that is the greatest common factor.

Example: \((7x^2y + 14xy) \rightarrow \text{GCF is } 7xy\)

\[= 7xy(x + 2)\]

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<tbody>
<tr>
<td>1.</td>
<td>((10x^7y^5 + 5x^5y^3))</td>
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<tr>
<td>3.</td>
<td>((4x^6y^6 + 8x^5y^3))</td>
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<tr>
<td>5.</td>
<td>((12g^7f^5 + 8g^4f^2))</td>
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<tr>
<td>7.</td>
<td>((100f^3g^2 + 200f^4g^2))</td>
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<tr>
<td>9.</td>
<td>((21a^2b + 14b))</td>
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<tr>
<td>10.</td>
<td>((16k^4g^3 + 24k^2g))</td>
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<tr>
<td>11.</td>
<td>((-18x^7y^5 - 20x^5y^3))</td>
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<tr>
<td>12.</td>
<td>((45m^4n + 35m^4))</td>
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<tr>
<td>13.</td>
<td>((-16g^4h^5 - 32g^5h^7))</td>
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<tr>
<td>14.</td>
<td>((5x^5y^5 + 30x^3y^3))</td>
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<tr>
<td>15.</td>
<td>((28x^6y^4 + 20x^5y^3 + 42x^3y^3))</td>
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<tr>
<td>16.</td>
<td>((21a^9b^5 + 39a^7b^8 + 12a^2b))</td>
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<tr>
<td>17.</td>
<td>((36x^8y^4 + 16x^5y^7 + 12x^3y^3))</td>
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<tr>
<td>18.</td>
<td>((4a^6b^4 + 6a^5b^3 + 10a^3b^3))</td>
</tr>
</tbody>
</table>
19. \((60y^4 + 42y^7 + 18y^3)\)

20. \((40x^4y^4 + 24x^9y^7 + 48x^3y^5)\)

21. \((48y^7 + 800y^5 + 256y^8)\)

22. \((12x^2 + 8x^5 + 6x^9 - 12x^7)\)

23. \((10x^8y^7 + 25x^5y^{10} + 30x^9y^9 - 100x^7y^8)\)

24. \((256x^9y^7 + 144x^7y^3 + 346x^8y^5 - 278y^5 + 436x^5y^7)\)
Greatest Common Factor

Shuffle Match

Directions

• Print the slides
  • Full page, one-sided
  • Suggestion: Use card stock
  • Suggestions: Print multiple sets on different colors
• Cut each page so that you will have 2 binomial cards and 2 GCF cards (4 cards total)
• Shuffle the cards

Activity

Divide the class into two teams. Each team has a set of cards (or 2 sets of cards). Have the students work together to match the pairs as a team. Have the students staple the pairs together, or verify the match with the teacher before submitting it to their “complete” pile. Compete for the team to finish the activity the quickest and most
\[20x^2y + 10x^2y^2\]  GCF is  \[10x^2y\]

\[8x^3y^7 + 12x^2y^5\]  GCF is  \[4x^2y^5\]
$30x^2y^9 + 70x^4y^2$ 

GCF is $10x^2y^2$

$28x^3y + 16x^2y^5$ 

GCF is $4x^2y$
\[
12x^3y^3 + 8xy^2
\]
GCF is \(4xy^2\)

\[
18x^8y^4 + 12x^3y^2
\]
GCF is \(6x^3y^2\)
\[ 33x^2y^9 + 27x^2y^3 \quad \text{GCF is} \quad 3x^2y^3 \]

\[ 27xy^2 + 36x^3y^7 \quad \text{GCF is} \quad 9xy^2 \]
\[6xy^5 + 3x^3y^2\]  
\[45x^2y^4 + 18x^4y^3\]

GCF is \[3xy^2\]

GCF is \[9x^2y^3\]
\[27x^4y^6 + 36x^6y^2\]

GCF is \(9x^4y^2\)

\[21x^2y^7 + 14x^5y^5\]

GCF is \(7x^2y^5\)
\[21x^5 y^3 + 7x^6 y^2\]

GCF is \(7x^5 y^2\)

\[56x^6 y^3 + 21x^5 y^3\]

GCF is \(7x^5 y^3\)
\[ 21x^4y^3 + 24x^6y^2 \]  
GCF is \(3x^4y^2\)

\[ 27x^2y^6 + 21x^4y^4 \]  
GCF is \(3x^2y^4\)
\[16x^2y^4 + 28x^3y^3\] GCF is \(4x^2y^3\)

\[25x^7y^3 + 20x^4y^2\] GCF is \(5x^4y^2\)
\[ 15x^3y^4 + 35x^4y^2 \]

GCF is \( 5x^3y^2 \)

\[ 20x^2y^4 + 45x^3y^3 \]

GCF is \( 5x^2y^3 \)
\[21x^5y^2 + 28x^2y^3\]  
GCF is \[7x^2y^2\]

\[32x^2y^4 + 36x^5y^3\]  
GCF is \[4x^2y^3\]
\[40x^3y^5 + 12x^4y^2\] GCF is \(4x^3y^2\)

\[14x^4y^2 + 32x^6y^3\] GCF is \(2x^4y^2\)
\[42x^2y^3 + 22x^4y^2\]  
GCF is \[2x^2y^2\]

\[30x^2y^6 + 16x^5y^4\]  
GCF is \[2x^2y^4\]
\[14x^3y^6 + 18x^4y^4\]  
GCF is \(2x^3y^4\)

\[32x^2y^6 + 14x^5y^3\]  
GCF is \(2x^2y^3\)
1. What do you do with coefficients when you divide polynomials?

2. What do you do with exponents when you divide polynomials?

3. Divide $h^2 \div h^2$

4. Divide $8x^3 \div x^3$

5. Divide $(40k^8 + 20k^4) \div 5k^6$

6. Divide $(24x^9 + 36x^8 + 12x^5) \div 6x^3$
2

1. Find the greatest common factor of each of the following:

a. $2x^2 + 4x^3$

b. $6x^8 + 12x^3 + 18x^2$

c. $-7x^5 - 6x^8$

d. $-8x^3 - 24x^4 - 32x^9$
1. **Factor** each of the following:

   a. $2x^2 + 4x^3$

   b. $6x^8 + 12x^3 + 18x^2$

   c. $-7x^5 - 6x^8$

   d. $-8x^3 - 24x^4 - 32x^9$
1. **Factor** each of the following:

   a. \(10x^4y^4 + 15x^7y^8 + 20x^5y^5\)

   b. \(35x^3y^9 + 25x^8y^2\)

   c. \(-100g^5k^3 - 75g^5k^9\)

   d. \(-16h^7k^5 - 24h^4k - 32h^5\)
1. **Factor** each of the following:

   a. $16a^7 + 12a^9 + 4a$

   b. $x^5 + x^8 + x^2$

   c. $-27x^3 - 54x^8$
d. $-48k^3 - 24k^6$

e. $x^4 + 2x^5 + 7x^3$

f. $22x^2 + 33x$

g. $32y^7 + 36y^9 + 16y^3$

h. $-50k^3 - 20k^7$
Step 1: Put tri in S.F.

Step 2: What 2 #s multiply to get last term & add to get middle?

(2 numbers \( \rightarrow \) multiply to get last coeff.
\( \rightarrow \) add/sub to get middle coeff.)

Step 3: Write the factors

\((X \underline{\quad})(X \underline{\quad})\)

2 #s!
EXAMPLE 1

What 2 #s multiply to 20 and add to -9?

Factors of 20

1 2 4
20 10 5

-4 + -5 = -9

-4, -5

EXAMPLE 2

Factor

$x^2 + 2x + 1$

Factors of 1

1

(x + 1)(x + 1)

EXAMPLE 3

Factor

$x^2 - 2x - 24$

Factors of 24

1 2 3 4
24 12 8 6

-6 + 4 = -2

(x - 6)(x + 4)
Find the Pair!

What is the pair of numbers that *multiply* to one number and *add/subtract* to the other? The first two have been done for you as examples.

<table>
<thead>
<tr>
<th>Multiplies to….</th>
<th>Add/subtract to….</th>
<th>What’s the pair?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. +8</td>
<td>+6</td>
<td>+2 and +4</td>
</tr>
<tr>
<td>2. +18</td>
<td>-9</td>
<td>-6 and -3</td>
</tr>
<tr>
<td>3. -6</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>4. +25</td>
<td>+10</td>
<td></td>
</tr>
<tr>
<td>5. +32</td>
<td>+12</td>
<td></td>
</tr>
<tr>
<td>6. -28</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>7. +3</td>
<td>-4</td>
<td></td>
</tr>
<tr>
<td>8. +30</td>
<td>+13</td>
<td></td>
</tr>
<tr>
<td>9. -14</td>
<td>+5</td>
<td></td>
</tr>
<tr>
<td>10. +27</td>
<td>+12</td>
<td></td>
</tr>
<tr>
<td>11. +12</td>
<td>-7</td>
<td></td>
</tr>
<tr>
<td>12. +48</td>
<td>+16</td>
<td></td>
</tr>
<tr>
<td>13. -4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>14. -35</td>
<td>-2</td>
<td></td>
</tr>
<tr>
<td>15. +6</td>
<td>-7</td>
<td></td>
</tr>
</tbody>
</table>
Factor That!

Find the factors for the trinomials.

Example: $x^2 + 5x - 14$

Factors of 14: 1, 14  2, 7

Add/Subtract: +7 − 2 = +5

Factors are $(x + 7)(x - 2)$

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $x^2 + 6x + 9$</td>
<td>2. $x^2 + 3x + 2$</td>
</tr>
<tr>
<td>3. $x^2 - 10x + 24$</td>
<td>4. $x^2 + 9x + 14$</td>
</tr>
<tr>
<td>5. $x^2 + 11x + 24$</td>
<td>6. $x^2 - 3x + 2$</td>
</tr>
<tr>
<td>7. $x^2 + 2x - 15$</td>
<td>8. $x^2 - 12x + 27$</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>9.</td>
<td>$x^2 + 8x + 7$</td>
</tr>
<tr>
<td>10.</td>
<td>$x^2 + 8x + 16$</td>
</tr>
<tr>
<td>11.</td>
<td>$x^2 + x - 6$</td>
</tr>
<tr>
<td>12.</td>
<td>$x^2 - x - 20$</td>
</tr>
<tr>
<td>13.</td>
<td>$x^2 - 11x + 30$</td>
</tr>
<tr>
<td>14.</td>
<td>$x^2 + 3x - 4$</td>
</tr>
<tr>
<td>15.</td>
<td>$x^2 + 2x - 80$</td>
</tr>
<tr>
<td>16.</td>
<td>$x^2 + 15x + 36$</td>
</tr>
<tr>
<td>17.</td>
<td>$x^2 + 11x + 18$</td>
</tr>
<tr>
<td>18.</td>
<td>$x^2 + x - 42$</td>
</tr>
<tr>
<td>19.</td>
<td>$x^2 + 0x - 16$</td>
</tr>
<tr>
<td>20.</td>
<td>$x^2 + 13x + 40$</td>
</tr>
</tbody>
</table>
Review for November 10th Assessment

**Prime Numbers**

Definition: ________________________________

1. What are all the prime numbers from 1 to 20?

2. Is 1 a prime number?

**Prime Factorization**

Definition: ________________________________

Remember: Do NOT include 1 in your prime factorization!

1. Find the prime factorization of:
   a. 18
   b. 36

**Greatest Common Factor**

Definition: ________________________________

1. What is the GCF of:
   a. $16x^7$ and $28x^3$
   b. $15x^7y^5$ and $20x^4$
   c. $12x^4 + 10x^5 + 6x^3$
   d. $21x^5y^4 + 14x^5y^8$
Factoring Out Monomials

Monomials Definition: ____________________________________________________________

Factoring Definition: ___________________________________________________________

1. Divide:
   a. \( k^2 \div k^2 \)  
   b. \( 8x^4y^7 \div 4x^2 \)
   c. \( (16x^5 + 10x^2) \div 2x \)  
   d. \( (12x^7y^5 + 16x^8y) \div 4x^5y \)

2. Factor:
   a. \( 12x^2 + 6x^4 \)  
   b. \( 15y^3 + 5y^2 + 20y \)
   c. \( 24b^7 + 32b^3 \)  
   d. \( 21x^4 + 42x^3 + 14x^2 \)
   e. \( x^5 + x^4 + x^3 \)  
   f. \( 6x^4 + x^3 + 2x^8 \)
**Factoring Trinomials into Two Binomials**

**Binomials Definition:** ______________________________________________________________________________________

1. Find the pair of numbers:
   a. Multiply to +10
      Add/Subtract to +7
   b. Multiply to -8
      Add/Subtract to +2
   c. Multiply to +18
      Add/Subtract to -9
   d. Multiply to -21
      Add/Subtract to -4

2. Factor:
   a. \(x^2 + 6x + 9\)
   b. \(x^2 + x - 30\)
   c. \(x^2 - 8x + 15\)
   d. \(x^2 + 12x + 20\)
   e. \(x^2 - 5x - 36\)
   f. \(x^2 + 5x - 14\)
   g. \(x^2 + 0x - 25\)
   h. \(x^2 + 13x + 42\)
Review for November 10\textsuperscript{th} Assessment

\textbf{Prime Numbers}

Definition: \underline{______________________________}

1. What are all the prime numbers from 1 to 20?

2. Is 1 a prime number?

\textbf{Prime Factorization}

Definition: \underline{______________________________}

Remember: Do NOT include 1 in your prime factorization!

1. Find the prime factorization of:
   a. 18
   b. 36

\textbf{Greatest Common Factor}

Definition: \underline{______________________________}

1. What is the GCF of:
   a. $16x^7$ and $28x^3$
   b. $15x^7y^5$ and $20x^4$
   c. $12x^4 + 10x^5 + 6x^3$
   d. $21x^5y^4 + 14x^5y^8$
Factoring Out Monomials

Monomials Definition: ________________________________

Factoring Definition: ________________________________

1. Divide:
   a. \( k^2 \div k^2 \)
   b. \( 8x^4y^7 \div 4x^2 \)
   c. \( (16x^5 + 10x^2) \div 2x \)
   d. \( (12x^7y^5 + 16x^8) \div 4x^5y \)

2. Factor:
   a. \( 12x^2 + 6x^4 \)
   b. \( 15y^3 + 5y^2 + 20y \)
   c. \( 24b^7 + 32b^3 \)
   d. \( 21x^4 + 42x^3 + 14x^2 \)
   e. \( x^5 + x^4 + x^3 \)
   f. \( 6x^4 + x^3 + 2x^8 \)
### Factoring Trinomials into Two Binomials

**Binomials Definition:**

1. Find the pair of numbers:

<table>
<thead>
<tr>
<th>a. Multiply to +10</th>
<th>b. Multiply to -8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add/Subtract to +7</td>
<td>Add/Subtract to +2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>c. Multiply to +18</th>
<th>d. Multiply to -21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add/Subtract to -9</td>
<td>Add/Subtract to -4</td>
</tr>
</tbody>
</table>

2. Factor:

<table>
<thead>
<tr>
<th>a. $x^2 + 6x + 9$</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. $x^2 + x - 30$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>c. $x^2 - 8x + 15$</th>
</tr>
</thead>
<tbody>
<tr>
<td>d. $x^2 + 12x + 20$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e. $x^2 - 5x - 36$</th>
</tr>
</thead>
<tbody>
<tr>
<td>f. $x^2 + 5x - 14$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>g. $x^2 + 0x - 25$</th>
</tr>
</thead>
<tbody>
<tr>
<td>h. $x^2 + 13x + 42$</td>
</tr>
</tbody>
</table>
November 10th Assessment

1. Circle all prime numbers:

1  2  4  7  9  11  13  14  15  16  18  19  20  21  24  25

2. Find the prime factorization of the following:
   (Hint: Use the factor tree!)

   a. 15
   b. 18

3. Find the factors of the following numbers and terms:
   The first one has been done for you as an example.

   a. 10
   1 ⋅ 10
   2 ⋅ 5
   1, 2, 5, 10
   b. 18

   c. 20
   d. 16
4. Find the **greatest common factor** of the following:

   a. 20 and 25  
   b. $x^8$ and $x^4$

   c. $3x^5 + 9x^8$  
   d. $4xy^3$ and $12x^4y^2$

5. **Factor out the monomials** for each of the following:

   a. $5x^5 + 10x^3$  
   b. $a^6 + a^4 + a^2$

   c. $12y^5 + 13y^2$  
   d. $14x^5y^5 + 7x^7y^2$

6. Find the **two numbers** that:

   a. Multiply to +10  
      Add/Subtract to +7

   b. Multiply to +18  
      Add/Subtract to -11
7. **Factor** the following **trinomials** into two **binomials**:
   a. \( x^2 + 8x + 16 \)  
   b. \( x^2 - 5x - 14 \)

8. Find the **prime factorization** of the following:  
   *(Hint: Use the factor tree!)*
   a. 30  
   b. 16

9. Find the **factors** of the following numbers and terms:
   a. 14  
   b. 25  
   c. 56  
   d. 42
10. Find the **greatest common factor** of the following:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 18 and 36</td>
<td>b. $6x^7 + 10x^9$</td>
</tr>
<tr>
<td>c. $42y^5 + 24y^2$</td>
<td>d. $18x^4$ and $12x^6y^2$</td>
</tr>
</tbody>
</table>

11. **Factor** each of the following by *taking out monomials*:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $20x^8 + 10x^5$</td>
<td>b. $b^8 + b^7 + b^3$</td>
</tr>
<tr>
<td>c. $25k^8 + 45k^3$</td>
<td>d. $40x^3y^8 + 16x^4$</td>
</tr>
</tbody>
</table>

12. Find the **two numbers** that:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a. Multiply to +18  
Add/Subtract to +3 | b. Multiply to -56  
Add/Subtract to -1 |
13. **Factor** the following **trinomials** into two **binomials**:  

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. (x^2 - 8x + 16)</td>
<td>b. (x^2 - x - 20)</td>
</tr>
<tr>
<td>c. (x^2 + 7x + 10)</td>
<td>d. (x^2 + 14x + 45)</td>
</tr>
</tbody>
</table>
14. **Rate** yourself on how you feel on each topic. Use **complete sentences** to explain why.

**Finding the prime factorization**
I don’t have a clue—1 2 3 4 5—I could teach it
Why?

________________________________________________________________________
________________________________________________________________________

**Finding factors of terms**
I don’t have a clue—1 2 3 4 5—I could teach it
Why?

________________________________________________________________________
________________________________________________________________________

**Finding the greatest common factor**
I don’t have a clue—1 2 3 4 5—I could teach it
Why?

________________________________________________________________________
________________________________________________________________________

**Factoring out monomials**
I don’t have a clue—1 2 3 4 5—I could teach it
Why?

________________________________________________________________________
________________________________________________________________________

**Factoring trinomials into two binomials**
I don’t have a clue—1 2 3 4 5—I could teach it
Why?

________________________________________________________________________
________________________________________________________________________

15. ***Extra Credit***
Factor: $3x^2 + 24x + 45$
November 10\textsuperscript{th} Assessment

1. Circle all \textbf{prime numbers}:

\begin{center}
\begin{tabular}{cccccccccccc}
1 & 3 & 5 & 7 & 8 & 9 & 11 & 13 & 15 & 17 & 18 & 20 & 21 & 23 & 24 & 25 \\
\end{tabular}
\end{center}

2. Find the \textbf{prime factorization} of the following:
\hspace{1cm} (\textit{Hint: Use the factor tree!})

\begin{tabular}{ll}
a. & 12 \\
\hline
b. & 24 \\
\hline
\end{tabular}

3. Find the \textbf{factors} of the following numbers and terms:
\hspace{1cm} The first one has been done for you as an example.

\begin{tabular}{ll}
a. & 10 \\
\hline
& \begin{tabular}{c}
1 \cdot 10 \\
2 \cdot 5 \\
\end{tabular} \\
\hline
b. & 20 \\
\hline
c. & 8 \\
\hline
d. & 18 \\
\hline
\end{tabular}
4. Find the **greatest common factor** of the following:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 8 and 16</td>
<td>b. ( x^9 ) and ( x^3 )</td>
</tr>
<tr>
<td>c. ( 6x^4 + 9x^8 )</td>
<td>d. ( 18x^2y^7 ) and ( 12x^7y^6 )</td>
</tr>
</tbody>
</table>

5. **Factor out the monomials** for each of the following:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ( 28x^5 + 14x^3 )</td>
<td>b. ( a^4 + a^8 + a^3 )</td>
</tr>
<tr>
<td>c. ( 7y^6 + 3y^3 )</td>
<td>d. ( 16x^9y^5 + 8x^7y^3 )</td>
</tr>
</tbody>
</table>

6. Find the **two numbers** that:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a. *Multiply to +16*  
*Add/Subtract to +10* | b. *Multiply to +21*  
*Add/Subtract to -10* |
7. **Factor** the following trinomials into two binomials:

   | a.  $x^2 + 4x + 8$ | b.  $x^2 - x - 20$ |

8. Find the **prime factorization** of the following:
   *(Hint: Use the factor tree!)*

   | a.  10 | b.  32 |

9. Find the **factors** of the following numbers and terms:

   | a.  30 | b.  42 |
   | c.  14 | d.  15 |
10. Find the **greatest common factor** of the following:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 16 and 36</td>
<td>b. $8x^{10} + 10x^4$</td>
</tr>
<tr>
<td>c. $48y^5 + 24y^4$</td>
<td>d. $20x^5$ and $12x^6y^2$</td>
</tr>
</tbody>
</table>

11. **Factor** each of the following by *taking out monomials*:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $25x^7 + 10x^5$</td>
<td>b. $b^9 + b^7 + b^4$</td>
</tr>
<tr>
<td>c. $36k^8 + 12k^6$</td>
<td>d. $20x^8y^8 + 18x^4$</td>
</tr>
</tbody>
</table>

12. Find the **two numbers** that:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a. *Multiply to* +20  
*Add/Subtract to* -9 | b. *Multiply to* +6  
*Add/Subtract to* +5 |
13. **Factor** the following **trinomials** into two **binomials**:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $x^2 - 9x + 18$</td>
<td>b. $x^2 - x - 12$</td>
</tr>
<tr>
<td>c. $x^2 - 7x + 10$</td>
<td>d. $x^2 + 14x + 49$</td>
</tr>
</tbody>
</table>
14. Rate yourself on how you feel on each topic. Use complete sentences to explain why.

Finding the prime factorization
I don’t have a clue—1 2 3 4 5—I could teach it
Why?
________________________________________________________________________

Finding factors of terms
I don’t have a clue—1 2 3 4 5—I could teach it
Why?
________________________________________________________________________

Finding the greatest common factor
I don’t have a clue—1 2 3 4 5—I could teach it
Why?
________________________________________________________________________

Factoring out monomials
I don’t have a clue—1 2 3 4 5—I could teach it
Why?
________________________________________________________________________

Factoring trinomials into two binomials
I don’t have a clue—1 2 3 4 5—I could teach it
Why?
________________________________________________________________________

15. ***Extra Credit
Factor: $3x^2 + 24x + 45$
November 10th Assessment

1. Circle all prime numbers:

1  2  3  6  8  9  10  13  14  16  19  21  22  23  24  27

2. Find the prime factorization of the following:
   (Hint: Use the factor tree!)

   a. 12
   b. 24

3. Find the factors of the following numbers and terms:
   The first one has been done for you as an example.

   a. 10
      1 · 10
      2 · 5
   b. 9
      1, 2, 5, 10
   c. 32
   d. 16
4. Find the **greatest common factor** of the following:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 20 and 16</td>
<td>b. $x^5$ and $x^3$</td>
</tr>
<tr>
<td>c. $10x^5 + 20x^3$</td>
<td>d. $40x^5y^5$ and $30x^9y^6$</td>
</tr>
</tbody>
</table>

5. **Factor out the monomials** for each of the following:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $50x^5 + 25x^4$</td>
<td>b. $a^9 + a^8 + a^3$</td>
</tr>
<tr>
<td>c. $27y^6 + 3y^3$</td>
<td>d. $12x^3y^5 + 8x^7y^3$</td>
</tr>
</tbody>
</table>

6. Find the **two numbers** that:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a. *Multiply to* +18  
*Add/Subtract to* -11 | b. *Multiply to* +30  
*Add/Subtract to* +17 |
7. **Factor** the following **trinomials** into two **binomials**:
   a. \( x^2 + 2x + 1 \) 
   b. \( x^2 - 2x - 15 \)

8. Find the **prime factorization** of the following:
   *Hint: Use the factor tree!*
   a. 27
   b. 30

9. Find the **factors** of the following numbers and terms:
   a. 3
   b. 44
   c. 48
   d. 27
10. Find the **greatest common factor** of the following:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. 27 and 36</td>
<td>b. $10x^3 + 8x^4$</td>
</tr>
<tr>
<td>c. $12y^5 + 24y^4$</td>
<td>d. $42x^9y^4$ and $14x^3$</td>
</tr>
</tbody>
</table>

11. **Factor** each of the following by **taking out monomials**:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. $5x^8 + 10x^5$</td>
<td>b. $b^9 + b^7 + b^6$</td>
</tr>
<tr>
<td>c. $32k^8 + 12k^6$</td>
<td>d. $22x^6y^5 + 18x^4y^4$</td>
</tr>
</tbody>
</table>

12. Find the **two numbers** that:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| a. **Multiply to +5**  
   **Add/Subtract to -6** | b. **Multiply to +8**  
   **Add/Subtract to +6** |
13. **Factor** the following **trinomials** into two **binomials**:

<table>
<thead>
<tr>
<th>a. $x^2 - 12x + 20$</th>
<th>b. $x^2 - 4x - 12$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>c. $x^2 + 7x - 18$</td>
<td>d. $x^2 + 8x + 15$</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
14. Rate yourself on how you feel on each topic. Use **complete sentences** to explain why.

Finding the prime factorization
I don’t have a clue—1
Why?

Finding factors of terms
I don’t have a clue—1
Why?

Finding the greatest common factor
I don’t have a clue—1
Why?

Factoring out monomials
I don’t have a clue—1
Why?

Factoring trinomials into two binomials
I don’t have a clue—1
Why?

15. ***Extra Credit***
Factor: $3x^2 + 24x + 45$
Week 11
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 11/13/17

Unit 2: Polynomials

Target Skills

Day 1 Skill: 2-Step Factoring

Day 2/3 Skill: Solving for zeros from factored form

Day 4 Skill: Factoring then solving for roots
<table>
<thead>
<tr>
<th></th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WARM-UP</strong></td>
<td>Type II: Talk about factoring in 2 sentences</td>
<td>Type II: 2-Step factoring</td>
<td>Type I: What 5 words describe you?</td>
<td>Type II: Factor and solve for roots</td>
<td>Type I: What is your favorite restaurant?</td>
</tr>
<tr>
<td><strong>NOTES</strong></td>
<td>2-Step Factoring</td>
<td>Solving for zeros (From factored form)</td>
<td>None</td>
<td>Factoring then solving for roots</td>
<td>None</td>
</tr>
<tr>
<td><strong>TASK 1</strong></td>
<td>2-Step Factoring (GCF #)</td>
<td>Solving for zeros (degree 2)</td>
<td>Finish Puzzle Project (40 minutes)</td>
<td>Practice Activity (10-12 minutes)</td>
<td>Assessment Option 1 (Factoring Assortment) (40-45 minutes)</td>
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<td>(10-12 minutes)</td>
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<tr>
<td><strong>TASK 2</strong></td>
<td>2-Step Factoring (GCF monomial)</td>
<td>Solving for zeros (degree 3+)</td>
<td>Factor then Solve for Zeros Activity</td>
<td>Optional Shuffle Cards Match Competition</td>
<td>Assessment Option 2: Factoring Song/Play</td>
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<td></td>
<td>(12-15 minutes)</td>
<td>(10-12 minutes)</td>
<td>(20-25 minutes)</td>
<td>(12-15 minutes)</td>
<td>(15-20 minutes)</td>
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<tr>
<td><strong>TASK 3</strong></td>
<td>2-Step Factoring (GCF mix)</td>
<td>Factoring Puzzle (25 minutes)</td>
<td>None</td>
<td>Review Activity (12-15 minutes)</td>
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<td>(12-15 minutes)</td>
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<tr>
<td><strong>Quiz</strong></td>
<td>2 Examples</td>
<td>3 examples</td>
<td>None</td>
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<tr>
<td><strong>CLOSURE</strong></td>
<td>Sentence reflection on today’s lesson</td>
<td>Sentence reflection on today’s lesson</td>
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<td>(2-4 minutes)</td>
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<tr>
<td>HOMEWORK</td>
<td>Standard summary</td>
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</tbody>
</table>
| Materials | • Warm-Up (pink sheet)  
• Notes (gold sheet)  
• Worksheets (3)  
• Quiz (mini quiz)  
• Homework (green sheet)  
• Calculators  
• Multiplication chart | • Warm-Up (pink sheet)  
• Notes (gold sheet)  
• Worksheets (3)  
• Quiz sheet (tan sheet)  
• Homework sheet (green sheet)  
• Calculators  
• Multiplication chart | • Warm-Up (pink sheet)  
• Notes (gold sheet)  
• Worksheets (3)  
• Quiz (mini quiz)  
• Homework (green sheet)  
• Calculators  
• Multiplication chart | • Warm-Up (pink sheet)  
• Notes (gold sheet)  
• Assessment Part 1  
• Assessment Part 2  
• Instructions  
• Calculators  
• Multiplication chart |
| Vocabulary | (No new)  
• Factoring  
• Monomials  
• Trinomials  
• Binomials | (No new)  
• Factoring  
• Binomials  
• Monomials  
• Trinomials  
• Zeros  
• X-Intercept | (No new)  
• Factoring  
• Monomials  
• Trinomials  
• Binomials  
• Zeros | (No new)  
• Quadratic  
• Trinomials  
• Zeros  
• Quadratic Formula |
<table>
<thead>
<tr>
<th>I can...</th>
<th>X-Intercept</th>
<th>Quadratics</th>
<th>Quadratic Formula</th>
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<tbody>
<tr>
<td>I can solve a quadratic by factoring or using the quadratic formula.</td>
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<th>Quadratics</th>
<th>Quadratic Formula</th>
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<tr>
<td>I will be able to factor quadratics.</td>
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<td>I will be able to find prime factorization and GCF.</td>
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<td>I will be able to factor out monomials.</td>
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<tr>
<th>CC Standards</th>
<th>HSF.IF.C.8a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</th>
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</tbody>
</table>
Step 1: Factor out GCF

Step 2: Factor remaining

Step 3: Write Factors
EXAMPLE 1

Factor $\frac{2x^3 + 14x + 24}{x^2 + 2x + 2}

GCF $2$

$2 \cdot (x^2 + 7x + 12)$

$2(x + 3)(x + 4)$

EXAMPLE 2

Factor $\frac{x^5 + 2x^4 - 8x^3}{x^3}$

GCF $x^3$

$x^3 \cdot (x^2 + 2x - 8)$

$x^3(x + 4)(x - 2)$

EXAMPLE 3

Factor $\frac{4x^4 - 28x^3 + 40x^2}{4x^2}$

GCF $4x^2$

$4x^2 \cdot (x^2 - 7x + 10)$

$4x^2(x - 5)(x - 2)$
# 2-Step Factoring

**Activity 1:** Factor out the GCF (#) then factor the trinomial.

<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1. $6x^2 + 12x + 6$</td>
<td>2. $4x^2 - 12x - 16$</td>
<td>3. $3x^2 + 15x + 18$</td>
</tr>
<tr>
<td>$6(x^2 + 2x + 1)$</td>
<td>$4(x^2 - 3x - 4)$</td>
<td>$3(x^2 + 5x + 6)$</td>
</tr>
<tr>
<td>$6(x + 1)(x + 1)$</td>
<td>$4(x - 4)(x + 1)$</td>
<td>$3(x + 2)(x + 3)$</td>
</tr>
<tr>
<td>4. $3x^2 + 15x + 18$</td>
<td>5. $8x^2 + 128x + 504$</td>
<td>6. $5x^2 - 40x - 60$</td>
</tr>
<tr>
<td>7. $10x^2 - 10x - 560$</td>
<td>8. $9x^2 + 36x + 36$</td>
<td>9. $6x^2 + 42x + 60$</td>
</tr>
<tr>
<td>10. $3x^2 + 15x - 72$</td>
<td>11. $2x^2 - 4x - 126$</td>
<td>12. $8x^2 + 8x - 16$</td>
</tr>
</tbody>
</table>
2-Step Factoring

Activity 2: Factor out the GCF (monomial) then factor the trinomial.

1. $4x^3 - 32x^2 + 48x$
   
   $4x(x^2 - 8x + 12)$
   
   $4x(x - 2)(x - 6)$

2. $3x^7 + 6x^6 - 9x^5$

3. $9x^9 + 63x^8 + 54x^7$

4. $4x^7 + 4x^6 - 48x^5$

5. $10x^5 + 110x^4 + 240x^3$

6. $2x^9 + 28x^8 + 98x^7$

7. $8x^3 + 40x^2 + 48x$

8. $3x^5 + 30x^4 + 63x^3$

9. $5x^7 + 50x^6 + 45x^5$
2-Step Factoring Mix

Factor out the GCF and then factor the trinomial.

1. \(2x^7 + 26x^6 + 80x^5\)

2. \(9x^6 + 63x^5 + 90x^4\)

3. \(10x^2 + 10x - 20\)

4. \(4x^2 + 32x + 60\)

5. \(4x^9 + 32x^8 + 48x^7\)

6. \(9x^2 - 9x - 108\)
7. $6x^3 + 18x^2 - 60x$
8. $8x^7 + 96x^6 + 288x^5$
9. $7x^2 - 63x + 126$

10. $3x^5 - 30x^4 + 63x^3$
11. $4x^3 + 12x^2 - 40x$
12. $3x^2 - 33x + 54$
Finding Zeros from Factors

\[(x+5)(x-2)\]

Step 1: Set each thing equal to zero
\[x+5=0\]
\[x=5\]
\[x-2=0\]
\[x=2\]

Step 2: Solve for the variable

Step 3: List your answers
EXAMPLE 1

\[(x + 5)(x + 27)(4x + 16)\]

\[x + 5 = 0 \quad 4x + 16 = 0\]

\[x = -5 \quad 4x = -16\]

\[\frac{4x}{4} = \frac{-16}{4}\]

\[x = -4\]

\[x = -4, -5\]

EXAMPLE 2

\[5x^3 (x + 20)(2x + 10)\]

\[5x^3 = 0 \quad x + 20 = 0\]

\[\frac{5x^3}{5} = \frac{0}{5}\]

\[x^3 = 0 \quad x = -20\]

\[x = 20\]

\[\frac{2x + 10}{2} = \frac{-10}{2}\]

\[x = -5\]

\[x = 0, 20, -5\]

EXAMPLE 3
**Solving for the Zeros**

Set the binomials equal to zero to solve for x. You should have two answers for each problem.

1. \((x - 2)(x + 6) = 0\)  
2. \((x + 8)(x - 9) = 0\)

3. \((x - 2)(x + 7) = 0\)  
4. \((x + 14)(x - 1) = 0\)

5. \((3x + 15)(x + 6) = 0\)  
6. \((-7x + 28)(4x + 2) = 0\)

7. \((x - 9)(11x + 44) = 0\)  
8. \((8x + 56)(x + 9) = 0\)

9. \((x + 1)(x - 1) = 0\)  
10. \((2x + 18)(5x - 20) = 0\)

11. \((6x + 18)(x - 9) = 0\)  
12. \((x + 18)(x + 23) = 0\)

13. \((x - 5)(x - 7) = 0\)  
14. \((x + 19)(x - 13) = 0\)

15. \((x - 2)(x + 10) = 0\)  
16. \((x - 3)(x + 3) = 0\)
Solving for the Zeros

Set each equal to zero to solve for x. You should have more than 1 answer for each problem.

1. \(8x(x + 3)(x + 6)\)
2. \(9x(x + 2)(x + 8)(x + 9)\)

3. \((x - 2)(x + 10)(x + 7)\)
4. \(62x(x + 14)(x - 3)\)

5. \(5x(3x + 30)(3x + 6)\)
6. \(13x(-7x + 14)(4x - 2)\)

7. \((x + 22)(x - 9)(11x + 44)\)
8. \((x - 5)(8x + 48)(x - 1)\)

9. \((x + 2)(x + 5)(x - 1)\)
10. \((4x + 16)(x + 1)(2x + 12)(5x - 50)\)

11. \((7x + 28)(6x + 6)(3x - 9)\)
12. \(9x^5(x + 10)(x - 34)\)
Solving for Zeros QUIZ

1. \((x + 12)(x + 2) = 0\)

2. \((4x + 8)(3x - 9) = 0\)

Name: ______________________________  Hour: ________

Solving for Zeros QUIZ

1. \((x - 12)(x + 10) = 0\)

2. \((2x + 14)(2x - 8) = 0\)

Name: ______________________________  Hour: ________

Solving for Zeros QUIZ

1. \((5x + 15)(3x + 6) = 0\)

2. \((x + 13)(x + 2) = 0\)

Name: ______________________________  Hour: ________

Solving for Zeros QUIZ

1. \((x + 9)(x - 24) = 0\)

2. \((8x + 56)(3x + 9) = 0\)

Name: ______________________________  Hour: ________
Solving for Zeros QUIZ

1. 
   \((x + 7)(x - 7) = 0\)

2. 
   \((2x + 16)(5x - 25) = 0\)

Solving for Zeros QUIZ

1. 
   \((x + 10)(x - 9) = 0\)

2. 
   \((3x + 18)(10x + 20) = 0\)

Solving for Zeros QUIZ

1. 
   \((x + 5)(x - 9) = 0\)

2. 
   \((6x + 12)(2x - 8) = 0\)

Solving for Zeros QUIZ

1. 
   \((x + 2)(x - 3) = 0\)

2. 
   \((2x - 10)(4x + 16) = 0\)
Solving for Zeros QUIZ 2
1. $5x^2(3x - 9)(x + 7) = 0$
2. $(4x + 8)(3x - 9)(x + 2) = 0$

Solving for Zeros QUIZ 2
1. $(4x - 12)(x + 10)(5x - 10) = 0$
2. $4x^2(2x + 14)(2x - 8) = 0$

Solving for Zeros QUIZ 2
1. $(2x + 10)(x - 3)(2x + 18) = 0$
2. $10x^4(x + 13)(4x + 24) = 0$

Solving for Zeros QUIZ 2
1. $3x^2(x - 9)(6x - 24) = 0$
2. $(2x + 18)(7x - 56)(x + 9) = 0$
Solving for Zeros QUIZ 2

1. $5x(3x + 9)(2x - 20) = 0$

2. $(4x + 16)(x + 6)(x - 8) = 0$

Name: ______________________________  Hour: _______

Solving for Zeros QUIZ 2

1. $8x^5(2x + 8)(x + 9) = 0$

2. $(x - 12)(6x + 18)(2x + 10) = 0$

Name: ______________________________  Hour: _______

Solving for Zeros QUIZ 2

1. $8x^4(7x + 28)(x - 9) = 0$

2. $(8x - 32)(x + 12)(3x - 9) = 0$

Name: ______________________________  Hour: _______

Solving for Zeros QUIZ 2

1. $(4x - 32)(x + 2)(3x - 12) = 0$

2. $7x^5(5x + 10)(4x + 20) = 0$

Name: ______________________________  Hour: _______
Step 1: Factor!

Step 2: Find the zeros!
EXAMPLE 1
Find zeros of: \( x^2 + 5x + 4 \)

\((x + 3)(x + 2)\)

\[
\begin{align*}
  x + 3 &= 0 \\
  x + 2 &= 0 \\
  -3 &\quad -2 \\
  x &= -3 & x &= -2
\end{align*}
\]

\[
\boxed{x = -2, -3}
\]

EXAMPLE 2
Find zeros of: \( 3x^4 - 12x^3 - 15x^2 \)

\[
3x^2 (x^2 - 4x - 5) \]

\[
3x^2 (x - 5)(x + 1) \]

\[
\begin{align*}
  x - 5 &= 0 \\
  x + 1 &= 0 \\
  +5 &\quad -1 \\
  x &= 5 & x &= -1
\end{align*}
\]

\[
\boxed{x = -1, 0, 5}
\]

EXAMPLE 3
Find zeros of: \( 6y^3 + 18y^2 - 168y \)

\[
6y (y^2 + 3y - 28) \]

\[
6y (y + 7)(y - 4) \]

\[
\begin{align*}
  y + 7 &= 0 \\
  y - 4 &= 0 \\
  -7 &\quad +4 \\
  y &= -7 & y &= 4
\end{align*}
\]

\[
\boxed{y = -7, 0, 4}
\]
Factor Completely First
Then Find the Zeros

1. $x^2 - x - 12$
2. $x^2 - x - 20$
3. $x^2 - 5x - 14$
4. $x^2 - 4x - 5$
5. $x^2 + 6x + 5$
6. $x^2 + 3x - 10$
7. $x^2 + 7x + 10$

8. $x^2 + 2x - 15$

9. $x^2 + 5x - 24$

10. $x^2 - 2x - 3$

11. $x^2 + 7x - 30$

12. $x^2 - 2x - 24$
13. $x^2 + 3x - 4$

14. $x^2 + 11x + 24$

15. $x^2 - 13x + 40$

16. $2x^3 - 14x^2 + 20x$

17. $3x^6 + 6x^5 - 24x^4$

18. $8x^4 - 8x^3 - 16x^2x$
19. \(4x^4 + 16x^3 + 12x^2\)  
20. \(x^8 - 7x^7 + 12x^6\)  
21. \(3x^6 + 9x^5 - 54x^4\)  

22. \(2x^6 + 10x^5 + 12x^4\)  
23. \(8x^6 + 24x^5 - 224x^4\)  
24. \(2x^4 + 16x^3 + 30x^2\)
Finding Roots—November 16th

Directions

Step 1: Factor!

Step 2: Find the zeros!

Example:

\[ x^2 - 3x + 2 \]

Factor → \((x - 2)(x - 1)\)

Set Equal to Zero → \(x - 2 = 0\) \(x - 1 = 0\)

Find \(x\) → \(x = 2, 1\)

This is what zeros look like on a graph!
1. $x^2 + 13x + 36$

2. $3x^3 + 36x^2 + 81x$

3. $x^7 - 17x^6 + 72x^5$

4. $x^2 - 13x + 42$

5. $4x^3 - 12x^2 - 112x$

6. $9x^5 + 27x^4 + 18x^3$
7. \(8x^6 + 56x^5 + 80x^4\)  
8. \(x^2 + x - 30\)  

9. \(x^2 - x - 20\)  
10. \(x^2 + 16x + 48\)  

11. \(2x^8 + 2x^7 - 24x^6\)  
12. \(x^6 + 13x^5 - 30x^4\)
Shuffle Match—Quadratics to Zeros

Directions
- Print the slides
  - Full page, one-sided
  - Print multiple sets (one per group)
- Cut each page so that you will have 2 quadratic cards and 2 zeros cards (4 cards total)
- Shuffle the cards

Activity
Divide the class into groups. Each group has a set of cards. Have the students work together to match the pairs. Have the students staple the pairs together. Grade based on correct matches.

Suggestion: Remind students that they are matching the quadratics to their roots. They can write on the cards to help them.
\[ x^2 + 4x + 4 \]

Zeros: \[ X = -2 \]

\[ x^2 + 2x + 1 \]

Zeros: \[ X = -1 \]
\[ x^2 - 4x + 4 \] \quad \text{Zeros:} \quad X=+2

\[ x^2 - 2x + 1 \] \quad \text{Zeros:} \quad X=+1
$x^2 - 7x + 10$

Zeros: $X = +5, X = +2$

$x^2 + 8x + 7$

Zeros: $X = -7, X = -1$
\[x^2 - 3x - 18\] 
Zeros: \(X=-3, X=+6\)

\[x^2 + 3x - 28\] 
Zeros: \(X=-7, X=+4\)
\( x^2 + 3x - 18 \)

Zeros:
\[
X = +3, \quad X = -6
\]

\( x^2 - 3x - 28 \)

Zeros:
\[
X = +7, \quad X = -4
\]
\[ x^2 + 5x + 4 \]

Zeros: \[ X = -4, X = -1 \]

\[ x^2 - 6x + 5 \]

Zeros: \[ X = +5, X = +1 \]
\[ x^2 + 8x + 12 \]

Zeros: 
\[ X = -6, X = -2 \]

\[ x^2 + 7x + 12 \]

Zeros: 
\[ X = -3, X = -4 \]
\[ x^2 + 12x + 32 \]

Zeros:
\[ X = -8, X = -4 \]

\[ x^2 - 4x - 32 \]

Zeros:
\[ X = +8, X = -4 \]
$x^2 - 10x + 25$

Zeros: $X=+5, X=+5$

$x^2 + 0x - 25$

Zeros: $X=-5, X=+5$
\( x^2 + 9x + 8 \)

Zeros: \( X = -8, X = -1 \)

\( x^2 + 7x - 8 \)

Zeros: \( X = -8, X = +1 \)
\[ x^2 - 13x + 42 \]

Zeros: \( X=+7, X=+6 \)

\[ x^2 - x - 42 \]

Zeros: \( X=+7, X=-6 \)
\[ x^2 + x - 20 \]

Zeros:
\[ X = -5, X = +4 \]

\[ x^2 - x - 20 \]

Zeros:
\[ X = +5, X = -4 \]
\[ 4x^3 + 12x^2 - 40x \]

Zeros:
\[ X=0, X=-5, X=+2 \]

\[ 4x^3 - 12x^2 - 40x \]

Zeros:
\[ X=0, X=+5, X=-2 \]
\[ 2x^4 + 4x^3 - 6x^2 \]

Zeros:
\[ X=0, X=-3, X=+1 \]

\[ 2x^4 - 8x^3 + 6x^2 \]

Zeros:
\[ X=0, X=+3, X=+1 \]
\[3x^6 - 3x^5 - 18x^4\]

Zeros:
\[X=0, X=+3, X=-2\]

\[3x^6 + 21x^5 + 18x^4\]

Zeros:
\[X=0, X=-6, X=-1\]
\[2x^3 - 2x^2 - 40x\]

Zeros:
\[X=0, X=-4, X=+5\]

\[2x^3 + 18x^2 + 40x\]

Zeros:
\[X=0, X=-4, X=-5\]
Review Activity for Assessment

Vocabulary

Factors: ____________________________________________

Factoring: __________________________________________

Monomial: __________________________________________

Binomial: __________________________________________

Trinomial: __________________________________________

Greatest Common Factor: ______________________________

Reminders

What do you do with coefficients when you divide polynomials by monomials?

What do you do with exponents when you divide polynomials by monomials?

When you factor out the letter for GCF, do you use the smallest exponent or the biggest exponent? (circle one)

Smallest

Biggest
### Factoring Cheat Sheet

<table>
<thead>
<tr>
<th>Last Term</th>
<th>Middle Term</th>
<th>Factors</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the last term is positive</td>
<td>And if the middle term is positive</td>
<td>Then both factors are positive</td>
<td>$x^2 + 3x + 2 \rightarrow (x + 2)(x + 1)$</td>
</tr>
<tr>
<td>If the last term is positive</td>
<td>And if the middle term is negative</td>
<td>Then both factors are negative</td>
<td>$x^2 - 3x + 2 \rightarrow (x - 2)(x - 1)$</td>
</tr>
<tr>
<td>If the last term is negative</td>
<td>And if the middle term is positive</td>
<td>Then the bigger factor is positive, the smaller factor is negative</td>
<td>$x^2 + x - 6 \rightarrow (x + 3)(x - 2)$</td>
</tr>
<tr>
<td>If the last term is negative</td>
<td>And if the middle term is negative</td>
<td>Then the bigger factor is negative, the smaller factor is positive</td>
<td>$x^2 - x - 6 \rightarrow (x - 3)(x + 2)$</td>
</tr>
</tbody>
</table>
Practice Your Skills

Just Factor It Completely!

1. \(x^2 - 2x - 24\)  
2. \(x^2 + 13x + 30\)  

3. \(2x^3 - 12x^2 - 54x\)  
4. \(3x^4 - 24x^3 + 36x^2\)

Just Find the Zeros!

1. \((x - 5)(x + 7)\)  
2. \((x + 8)(x - 3)\)  

3. \(7x^2(x - 1)(x - 4)\)  
4. \(3x^2(x - 6)(x - 2)\)
Factor AND Find the Zeros!

1. $x^2 + 6x - 16$
2. $x^2 + 8x - 16$

3. $x^3 + 17x^2 + 72x$
4. $4x^{10} + 20x^9 - 24x^8$

5. $x^2 + 0x - 1$
6. $x^2 - 4x - 45$
7. \(7x^3 - 77x^2 + 210x\) 

8. \(3x^5 + 12x^4 + 9x^3\) 

9. \(x^2 - 12x + 36\) 

10. \(x^2 - 6x - 27\)
Friday November 17th Assessment

There is a factoring cheat sheet at the back of this packet if you need it.

Just Factor It Completely!

1. $x^2 - 12x + 27$
2. $x^2 + 10x + 9$
3. $3x^3 - 9x^2 + 6x$
4. $4x^6 + 8x^5 - 32x^4$
5. $x^2 + 9x + 14$
6. $4x^4 - 24x^3 + 20x^2$
Just Find the Zeros!

1. \((x - 9)(x + 15)\)
2. \((x + 12)(x + 8)\)

3. \(7x^2(x + 1)(x - 7)\)
4. \(3x^2(x + 2)(x + 9)\)

5. \(3x^3(x + 3)(x - 3)\)
6. \((4x + 8)(6x - 3)\)

7. \(6x^7(x + 16)(x - 14)\)
8. \((x - 10)(2x + 10)\)
Factor AND Find the Zeros!

1. \(x^2 + 11x + 18\)  
2. \(x^2 - 11x + 24\)  

3. \(x^2 - 15x + 50\)  
4. \(2x^4 - 2x^3 - 12x^2\)  

5. \(x^2 + 0x - 25\)  
6. \(x^2 + 4x - 45\)
7. $x^{11} + 16x^{10} + 63x^9$

8. $6x^3 - 30x^2 + 36x$

9. $x^2 - 2x - 24$

10. $x^2 + 4x - 5$

11. $x^4 + 3x^3 - 10x^2$

12. $x^2 - 11x + 28$
13. $3x^3 - 9x^2 + 6x$

14. $2x^3 - 4x^2 - 126x$

15. $x^2 + 10x + 25$

16. $x^2 + 8x - 20$

17. $9x^5 - 27x^4 + 18x^3$

18. $x^2 - 15x + 54$
Extra Credit

Find the zeros.

1. \(4x^{10} + 88x^9 + 480x^8\)

2. \(6x^4 + 28x^3 + 16x^2\)
# Factoring Cheat Sheet!

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</tr>
<tr>
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<td>And if the middle term is positive</td>
<td>Then the bigger factor is positive, the smaller factor is negative</td>
<td>( x^2 + x - 6 ) → ((x + 3)(x - 2))</td>
</tr>
<tr>
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<td>And if the middle term is negative</td>
<td>Then the bigger factor is negative, the smaller factor is positive</td>
<td>( x^2 - x - 6 ) → ((x - 3)(x + 2))</td>
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Friday November 17th Assessment

There is a factoring cheat sheet at the back of this packet if you need it.

**Just Factor It Completely!**

1. \(x^2 + 5x + 4\) 
2. \(x^2 - 10x + 16\)
3. \(8x^4 + 16x^3 + 8x^2\) 
4. \(4x^6 + 8x^5 - 32x^4\)
5. \(x^2 - x - 6\) 
6. \(2x^4 - 14x^3 + 24x^2\)
Just Find the Zeros!

1. $(x + 9)(x - 15)$

3. $10x^2(x - 20)(x - 7)$

5. $3x^{10}(x + 2)(x - 2)$

7. $6x^7(x - 13)(x + 14)$

2. $(x + 11)(x + 10)$

4. $3x^2(x + 2)(x + 9)$

6. $(8x + 4)(3x - 6)$

8. $(x + 12)(2x - 15)$
Factor **AND** Find the Zeros!

1. \(x^2 + 11x + 24\)  
2. \(x^2 - 6x + 8\)

3. \(x^2 - 15x + 50\)  
4. \(2x^4 - 2x^3 - 12x^2\)

5. \(x^2 + 0x - 16\)  
6. \(x^2 + 5x + 6\)
7. \(x^{11} - 2x^{10} - 15x^9\)

8. \(6x^4 + 30x^3 + 24x^2\)

9. \(x^2 - 2x - 24\)

10. \(x^2 + 4x - 5\)

11. \(x^3 - x^2 - 72x\)

12. \(x^2 - 11x + 28\)
13. $2x^6 - 26x^5 + 84x^4$

14. $3x^7 - 30x^6 + 27x^5$

15. $x^2 + 10x + 25$

16. $x^2 + 8x - 20$

17. $9x^5 - 27x^4 + 18x^3$

18. $x^2 - 3x - 54$
Extra Credit

Find the zeros.

1. $4x^{10} + 88x^9 + 480x^8$
2. $6x^4 + 28x^3 + 16x^2$
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</table>
Friday November 17th Assessment

There is a factoring cheat sheet at the back of this packet if you need it.

Just Factor It Completely!

1. $x^2 + 7x + 6$
2. $x^2 + 5x - 24$

3. $8x^4 + 16x^3 + 8x^2$
4. $4x^4 + 36x^3 + 56x^2$

5. $x^2 - 10x + 21$
6. $3x^5 + 3x^4 - 36x^3$
Just Find the Zeros!

1. \((x - 9)(x + 1)\) 
2. \((x + 3)(x - 19)\)

3. \(10x^2(x - 2)(x - 27)\) 
4. \(3x^2(x + 7)(x + 9)\)

5. \(3x^{10}(x + 3)(x - 3)\) 
6. \((10x + 5)(3x - 6)\)

7. \(7x^5(x + 1)(x + 1)\) 
8. \((x + 12)(2x - 15)\)
Factor AND Find the Zeros!

1. \( x^2 + 12x + 27 \) 

2. \( x^2 - 6x + 8 \)

3. \( x^2 - 15x + 50 \)

4. \( 4x^4 + 4x^3 - 80x^2 \)

5. \( x^2 + 0x - 9 \)

6. \( x^2 + 5x + 6 \)
7. \( 6x^3 - 30x^2 + 36x \)

8. \( x^5 + x^4 - 72x^3 \)

9. \( x^2 - 2x - 24 \)

10. \( x^4 - 5x^3 - 14x^2 \)

11. \( 7x^5 + 14x^5 - 21x^4 \)

12. \( x^2 - 11x + 28 \)
13. $9x^4 + 18x^3 - 27x^2$

14. $2x^3 + 6x^2 - 20x$

15. $x^2 - 10x + 25$

16. $x^2 - 9x + 14$

17. $2x^3 + 20x^2 + 42x$

18. $x^2 + x - 56$
Extra Credit

Find the zeros.

1. \(4x^{10} + 88x^9 + 480x^8\)
2. \(6x^4 + 28x^3 + 16x^2\)
## Factoring Cheat Sheet!

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<td>$x^2 - x - 6 \rightarrow (x - 3)(x + 2)$</td>
</tr>
</tbody>
</table>
Assessment Option

Factoring Song or Play

Your assignment is to come up with a song or write a play about factoring and finding zeros.

- You can work with a partner if you would like.
- You must use mathematical vocabulary.
- You must address the following topics:
  - Factoring a trinomial into 2 binomials—50 points
  - Factoring out a monomial—50 points
  - Factoring out a monomial and then factoring the trinomial—50 points
  - Finding zeros—50 points
- You must use at least one example for each of the 4 topics above.
- You can use the tune of a song or you can make up your own.
- You can use the concept of a story that already exists or you can make your own.
- For songs, you must perform your tune for Ms. Church and Ms. Sanfillippo.
  - You will be recorded for our own grading purposes.
- Total points: 300
  - 200 points for accuracy
  - 75 points for creativity
  - 25 points for performance
- You can receive 50 extra credit points if you perform your song for the class on Monday!😊
Week 12 MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 11/20/17

Unit 2: Polynomials

*Target Skills*

Day 1/2 Skill: Reviewing
<table>
<thead>
<tr>
<th></th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARM-UP</td>
<td>Type II: What is x when f(x)=#?</td>
<td>Type II: What is f(#) of a table?</td>
<td>No school</td>
<td>No school</td>
<td>No school</td>
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<tr>
<td>(5 minutes)</td>
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<tr>
<td>NOTES</td>
<td>None</td>
<td>None</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(8-10 minutes)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>TASK 1</td>
<td>End of the trimester project (60 minutes)</td>
<td>End of the trimester project (60 minutes)</td>
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<tr>
<td>TASK 2</td>
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<tr>
<td>TASK 3</td>
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<tr>
<td>(6-10 minutes)</td>
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</tr>
<tr>
<td>CLOSURE</td>
<td>Clean-Up</td>
<td>Clean-Up</td>
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<tr>
<td>(2-4 minutes)</td>
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<tr>
<td>HOMEWORK</td>
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<tr>
<td>Materials</td>
<td>• Warm-Up (pink sheet)</td>
<td>• Warm-Up (pink sheet)</td>
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<td>• End of the trimester outline</td>
<td>• End of the trimester outline</td>
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</tr>
<tr>
<td></td>
<td>• Colored paper, printer paper</td>
<td>• Colored paper, printer paper</td>
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</tr>
<tr>
<td></td>
<td>Calculators</td>
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</tr>
<tr>
<td>Vocabulary</td>
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<td>(No new)</td>
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</tr>
<tr>
<td>I can...</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I will...</td>
<td>• I will be able to reflect on what I learned.</td>
<td>• I will be able to reflect on what I learned.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CC Standards</td>
<td>All</td>
<td>All</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Algebra IIA Part A
End of the Trimester Project
November 20th

You’ve made it to the end of the trimester! It’s time to look back on what you’ve learned so far. You will choose a format to present the information below. Some examples include:

- Google Slides
- Google Document
- Mini Book
- Poster

If you have another format that you would like to use, talk to Ms. S or Ms. Church.

**TOTAL POINTS: 500 in the test/project category**

The information that you must include is:

- 5 things that you learned about yourself—20 points
- 20 new mathematical vocabulary words—5 points each
  - Use an example to demonstrate
  - ***Extra Credit: 5 points for each vocabulary word after the required 20
- 30 mathematical topics you learned about—10 points each
  - You must include examples to help demonstrate what you learned
  - ***Extra Credit: 10 points for each topic after the required 30
- 3 goals or things you want to improve on for next trimester and how you will accomplish them—60 points
- Overall presentation/design—20 points
  - Neatness
  - Organization
Week 13
MATERIAL
ALGEBRA II (4 tri)

LESSON PLAN WEEK OF 11/20/17

Unit 2: Polynomials

Target Skills

Day 1/2 Skill: Reviewing for final
<table>
<thead>
<tr>
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<th>THURSDAY</th>
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</thead>
<tbody>
<tr>
<td><strong>WARM-UP (5 minutes)</strong></td>
<td>Type II: Factor completely</td>
<td>None</td>
<td>Final exams</td>
<td>Final exams</td>
<td>Final exams</td>
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<tr>
<td><strong>NOTES (8-10 minutes)</strong></td>
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<tr>
<td><strong>TASK 1</strong></td>
<td>Review—Required to complete 9 pages (60 minutes)</td>
<td>Review—Required to complete 9 pages (65 minutes)</td>
<td></td>
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<tr>
<td><strong>TASK 2</strong></td>
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<tr>
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<td>None</td>
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<tr>
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<tr>
<td><strong>CLOSURE (2-4 minutes)</strong></td>
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<td>• Multiplication chart</td>
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 Algebra II A Part I  
 Trimester 1 Review

Use the distributive property:

1. \(2(3x + 7y - 8)\)  
2. \(7x(3 - 6x + 4y)\)

3. \(7 - 4(x + 9)\)  
4. \(5x(2 + 3y) - 4x\)

Simplify:

1. \(2x + 5y - 2 + 4y - 1\)  
2. \(4x^3 + 9x - 3x^2 - 7x + 6x^3\)

Evaluate:

1. \(2x + 3y - 4xy\) when \(x = -2\) and \(y = 4\)

2. \(2x^2 + 3xy + 4y^2\) when \(x = 2\) and \(y = -1\)
Algebra IIA Part I
Trimester 1 Review

Isolate the variable in 1 step:

1. \(5 = \frac{x}{3}\)
2. \(b - 10 = 12\)

3. \(7y = 42\)
4. \(k + 9 = -13\)

Isolate the variable in 2 or more steps:

1. \(9p - 7 = -16\)
2. \(2x + 5 = 13\)

3. \(\frac{y}{20} - 5 = -4\)
4. \(2(x + 3) = -10\)
Graph the following coordinate points on the graph to the right:

1. (4,6)  
2. (−4,3)  
3. (0,7)  
4. (−8,0)  
5. (−6,−2)  
6. origin

Graph the linear equations on the graphs below:

1. \( y = -4x + 6 \)  
2. \( y = -\frac{2}{3}x - 3 \)
3. \( y = 5x \)

4. \( y = 4 \)

5. \( x = 5 \)
Identify the domain and range for each of the following:

1. 
   ![Image 1](https://via.placeholder.com/150)
   Domain: 
   Range: 

2. 
   ![Image 2](https://via.placeholder.com/150)
   Domain: 
   Range: 

3. 
   ![Image 3](https://via.placeholder.com/150)
   Domain: 
   Range: 

Algebra IIA Part I
Trimester 1 Review
Decide if each of the examples below is a function or not.

If it is a function, write “F.” If it is not a function, write “NF.”

1. __________________________

2. __________________________

3. __________________________

4. __________________________
5. __________________________

6. __________________________

\{ (3,2), (2,8), (4,0), (2,8), (1,6), (0,3) \} \quad \{ (0,1), (2,3), (1,0), (3,4), (2,6), (4,3) \}

7. __________________________

8. __________________________
Evaluate the following functions:

\[ f(x) = 3x - 1 \quad g(x) = -2x + 8 \quad h(x) = -4x^2 + 2 \]

1. \( f(4) = \)  
2. \( f(-2) = \)  

3. \( g(8) = \)  
4. \( g(-1) = \)  

5. \( h(3) = \)  
6. \( h(-2) = \)  

7. \( f(x) = -7 \)  
8. \( f(x) = 17 \)  

9. \( g(x) = 28 \)  
10. \( g(x) = -6 \)  

11. \( h(x) = -14 \)
Add/Subtract the following functions. Put your answer in standard form.

\[ f(x) = 3x - 1 \quad g(x) = -2x + 8 \quad h(x) = -4x^2 + 2 \quad k(x) = 4x - 8 \]

1. \( f(x) + g(x) \)  
2. \( h(x) + g(x) \)

3. \( f(x) + k(x) \)  
4. \( j(x) + g(x) \)

5. \( f(x) - k(x) \)  
6. \( g(x) - j(x) \)

7. \( h(x) - k(x) \)  
8. \( f(x) - j(x) \)

9. \( (f + g)(3) \)  
10. \( (j + k)(-2) \)

11. \( (f - g)(2) \)  
12. \( (j - k)(-4) \)
Function Notation—Graphs and Tables

Find f(#)  
1. \( f(7) = \) ________  
2. \( f(-2) = \) ________  
3. \( f(0) = \) ________

Find x when given f(x)=#  
4. \( f(x) = 0, x = \) ________  
5. \( f(x) = -3, x = \) ________  
6. \( f(x) = 1.5, x = \) ________

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>-2</td>
<td>9</td>
</tr>
<tr>
<td>-3</td>
<td>5</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>
Classify the polynomials below by name and provide the degree:

<table>
<thead>
<tr>
<th>Polynomial</th>
<th>Name</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $6x^4y^2 + 8x^2y^3$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. $3a^9 - 2a^7 - 6 + 7a^3 - 3a^5$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. $4g^2h + 2gh^5 - 3g^3h^5$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. $7538a^4b^7c^2df^8$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Put the following polynomials in standard form and identify the leading coefficient (LC):

<table>
<thead>
<tr>
<th>Polynomial</th>
<th>Standard Form</th>
<th>LC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $2x^3 + 2x^4 + 2x^2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. $3a^9 - 2a^7 - 6 + 7a^3 - 3a^5$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. $4k^2 - 6 + 3k$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. $2y^4 - 3y^3 + 4y^2$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add or subtract the polynomials and put the answer in standard form

1. $(x^4 - 2x^3 + 7x) + (2x^3 - 6x^4)$
2. $(4y^2 + 8y^6 - 2y^4) + (6y^4 - 4y - 3y^6)$

3. $(5p^5 + 6p^3) - (2p^3 - 7p^5)$
4. $(4k^8 + 3k^5) - (3k^8 + 9k^5)$

5. $(4x^4 - 5x^3 + 3x) - (2x^3 - 7x^4)$
6. $(5a^2 + 5a^5 - 2a^4) - (6a^4 - 4a - 3a^2)$
Multiply the polynomials and put the answer in standard form.

*Hint: Use the distributive property, the FOIL method, or the BOX method to help you.*

1. $(2x^2) \cdot (4x^7)$
2. $(-3x) \cdot (6x^4)$

3. $3x^2(2x^7 - 8x^3)$
4. $-6x(3x^2 - 2x^5)$

5. $2x^6(8x^2 - 3x^3 + 2x)$
6. $5x^3(3x^4 + 3x^2 - 4x^5)$

7. $(2x^2 + 3x) \cdot (4x^2 + 2)$
8. $(6x^3 - 4) \cdot (4x^2 - 2x^4)$

9. $(4x^4 + 3x^2 - 3) \cdot (2x^3 + 2x)$
10. $(-2x^2 + 2x^3 + x) \cdot (5x^2 - 3x + 4)$
Divide the polynomials by monomials:

1. \((8x^3y^4 + 16x^3y^3) ÷ 4x^2y\)
2. \((20x^3 - 30x^2 + 10x) ÷ 5x\)

3. \((27x^7y^5 - 36x^5y^2) ÷ -9x^4\)
4. \((12a^7b^5 - 24a^5b^4) ÷ -6a^2b^5\)

5. \((18x^5 + 24x^2 - 12x^4) ÷ 6x^2\)
6. \((4y^7 - 6y^3) ÷ -2y\)

Divide the trinomials by binomials (no remainders):

1. \((x^2 + 3x + 2) ÷ (x + 1)\)
2. \((x^2 + 2x - 8) ÷ (x - 2)\)

3. \((3x^2 - 13x - 10) ÷ (3x + 2)\)
4. \((x^2 - 8x + 12) ÷ (x - 2)\)
Divide the trinomials by binomials (with remainders):

1. \((x^2 + 5x - 10) \div (x - 2)\)
2. \((x^2 + 4x - 2) \div (x + 5)\)
3. \((x^2 - 13x + 36) \div (x - 9)\)
4. \((x^2 + 8x + 12) \div (x + 3)\)
Find the prime factorization of the following numbers:

<table>
<thead>
<tr>
<th>36</th>
<th>20</th>
</tr>
</thead>
</table>

Find the greatest common factor (GFC) of the following:

1. 16 and 28
2. 30 and 24
3. $12x^5y^4$ and $32x^2y^7$
4. $18y^3$ and $16y$
5. $6a^3$ and $18a^3b^5$
6. $5k^7$ and $9k^3$
7. $14x^7$ and $28x^5$ and $35x^6$
8. $10a^5b^3$ and $5ab^3$ and $25b^6$
Factor the polynomials by factoring out the monomials:

1. $6x^4 + 12x^3$
2. $10y^9 + 14y^6 - 12y^4$
3. $a^5 - a^8 + a^2$
4. $20x^5 - 16x^3 + 12x$

Factor the trinomials into 2 binomials:

1. $x^2 + 5x + 6$
2. $x^2 - 12x + 32$
3. $x^2 - 2x - 63$
4. $x^2 + 5x - 24$
5. $x^2 + 13x - 30$
6. $x^2 + 13x + 42$
Factor COMPLETELY. You may have to factor out a monomial then, if possible, factor what is left.

1. $2x^3 + 2x^2 - 12x$
2. $3x^2 + 24x + 48$

3. $18x^8 + 24x^2$
4. $-3x^7 - 3x^6 + 6x^5$

5. $x^2 + 4x + 3$
6. $x^2 - 5x - 36$

Find the zeros of the following:

1. $(x + 6)(2x - 8) = 0$
2. $3x^5(x - 10)(3x + 9) =$
Find the zeros of the following (you have to factor first!):

1. \(2x^3 + 2x^2 - 12x = 0\)
2. \(x^2 + 5x - 24 = 0\)

3. \(2x^4 + 16x^3 + 14x^2 = 0\)
4. \(x^2 - 11x + 28 = 0\)
### Multiplication Practice

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$4 \cdot 6$</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$2 \cdot 3$</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$-5 \cdot 4$</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$3 \cdot -9$</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$-2 \cdot -7$</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$-8 \cdot -5$</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$1 \cdot 11$</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>$1 \cdot -1$</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>$-8 \cdot -2$</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$4 \cdot 8$</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>$-7 \cdot 5$</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>$4 \cdot -2$</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>$-6 \cdot 2$</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>$6 \cdot 8$</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>$-10 \cdot 7$</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>$8 \cdot 7$</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>$-9 \cdot 6$</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>$13 \cdot -1$</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>$-1 \cdot -1$</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>$8 \cdot -3$</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>$12 \cdot 2$</td>
<td></td>
</tr>
</tbody>
</table>
## Addition and Subtraction Practice

1. $4 + 6 =$   
2. $2 - 3 =$   
3. $-5 + 4 =$   

4. $3 - 9 =$   
5. $-2 + 13 =$   
6. $-8 - 5 =$   

7. $3 + 11 =$   
8. $9 - 5 =$   
9. $8 + 2 =$   

10. $4 - 8 =$   
11. $-7 + 5 =$   
12. $4 + 14 =$   

13. $-6 - 2 =$   
14. $6 + 8 =$   
15. $-10 + 7 =$   

16. $8 - 7 =$   
17. $-6 + 6 =$   
18. $-13 + 15 =$   

19. $4 + 10 =$   
20. $8 - 3 =$   
21. $12 + 2 =$
Division Practice

1. \(35 \div 5 = \)  
2. \(24 \div 6 = \)  
3. \(36 \div 6 = \)  
4. \(9 \div -3 = \)  
5. \(-18 \div 2 = \)  
6. \(4 \div 4 = \)  
7. \(20 \div 4 = \)  
8. \(40 \div -8 = \)  
9. \(-63 \div -9 = \)  
10. \(30 \div 10 = \)  
11. \(54 \div 6 = \)  
12. \(-5 \div 5 = \)  
13. \(28 \div 4 = \)  
14. \(81 \div -9 = \)  
15. \(14 \div 2 = \)  
16. \(-1 \div -1 = \)  
17. \(-15 \div 5 = \)  
18. \(42 \div 6 = \)  
19. \(56 \div 7 = \)  
20. \(-18 \div -2 = \)  
21. \(48 \div 6 = \)
Evaluating/Substituting Practice

1. $2x + 4y$ when $x = 3$ and $y = -2$

2. $-x + 5y$ when $x = 4$ and $y = -5$

3. $7x - 6y$ when $x = 8$ and $y = 3$

4. $9xy$ when $x = -6$ and $y = 10$

5. $6x - y$ when $x = 8$ and $y = -7$

6. $10x - 5y$ when $x = 4$ and $y = 4$

7. $5xy - 4y - 3x$ when $x = 5$ and $y = 4$

8. $8x - 7yz$ when $x = -4$, $y = 1$, and $z = 6$

9. $x + 4y - 6xy$ when $x = 3$ and $y = -2$

10. $2xy + 4z$ when $x = 5$, $y = -2$, and $z = 9$
Imagine that your college professor assigned for homework that you had to read and takes notes on the next day’s lesson. This means that you are responsible for learning the material on your own.

For this assignment, you will be making your own notes on the topic: __________________________________________________________.

You can use our usual notes sheet, or you can make up your own. In your notes, you must include new vocabulary (with definitions), steps for any procedures, and 3 examples. You can utilize a textbook or the Chromebook for your research. You can use videos or websites that have the information you need. You may work with a partner if you wish, but you must both turn in your notes (which will be returned).

This assignment is worth 50 points.

Make sure you include:

- Topic
- Date
- New vocabulary
- Procedures
- 3+ Examples
Textbook Scavenger Hunt

This assignment is to help familiarize you with a textbook so that you can use it to your advantage. Use the textbook to answer the following questions.

1. What is the Table of Contents?

   Where can you find the Table of Contents?

2. Choose any chapter from the Table of Contents.

   What is the title? _____________________________________
   What page is it on? ________

3. Go to the chapter you chose.
   What can be found on the first page?

4. Go to the end of the chapter.
   What can be found at the end of the chapter?

5. What is a heading?

   How can headings be helpful to you?

   Write down one of the headings from the chapter you chose:
   ___________________________________
6. Find a visual aid (graph, chart, table, etc.).
   What page is it on?

   Read any text that is with the visual aid.
   Explain how this visual aid can be helpful in your understanding of the material.

7. Go to the back of the book and find the index.
   What kind of information is in the index?

   How can the index be helpful for you?

8. Go to the back of the book and find the glossary.
   What kind of information is in the glossary?

   How can the glossary be helpful for you?