



The Creation of a Video Review Guide for the Free- Response Section of the Advanced Placement Calculus Exam

Lee Honors College Thesis Defense

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Introductions

Origins

- High School Experience
- Tutor
- Cost
- Free Resource



Goal

- *Through this project, I want to create an accessible resource that reviews content, provides insights into the AP exam, and creates successful habits in student responses.*

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- *Through this project, I want to create an **ACCESSIBLE** resource that **REVIEWS CONTENT**, provides insights into the AP exam, and creates successful habits in student responses.*

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- *Through this project, I want to create an **ACCESSIBLE** resource that **REVIEWS CONTENT, PROVIDES INSIGHTS** into the AP exam, and creates successful habits in student responses.*

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Development

- Free
- Accessible



Development

- Graphics Tablet
- Drawing Software
- Audio Recording Device
- Screen Capturing Software
- Wacom Intuos Creative Pen Tablet
- SmoothDraw
- Koss CS95 USB communication headset
- CamStudio

Development

- College Board Website
- Free Response Questions (FRQ) archive
- Classification Document (1969 – 2010)
- Completed 2011-2013 Exams



Major Topic	Problem Topic	2011-2013 Questions	Appearances on AP Exam from 1969-2010
Particle Motion		2011 #1, 2012 #6, 2013#2	50
	Direction	2011 #1d, 2012 #6a, 2013#2c	
	Speed/Velocity	2011 #1a, 2013#2a	
	Position/Speed/ Acceleration	2012 # 6 c and d	
Model of a Function		2011 #2, 2012 #1, 2013 #3	
	Average using Various Methods	2011 #2b, 2012 #1c, 2013 #3c	20
	Total Change	2011 #2c, 2012 #1b	77
	Rate at a Given Point	2011 #2a, 2012 #1a, 2013 #3a	61
Differential Equations		2011 #5, 2012 #5, 2013 #3	
	Solve using Initial Conditions	2011 #5c, 2012 #5c, 2013 #3b	103
	Tangent Line	2011 #5a, 2013 #a	61
	Find Second Derivative	2011 #5b, 2012 #5b,	36
Regions Formed by Two Functions		2011 #3, 2012 # 2, 2013 #5	
	Find Area of Region	2011 #3b, 2012 # 2a, 2013 #5a	61
	Volume by Rotation	2011 #3c, 2013 #5b	48
	Region as Base of a Solid	2012 # 2b, 2013 #5c	15

Development

- Made Videos
- Used an exam question in each
- Edited and Published to YouTube
- Sent to Teachers for comments

Differential Equations

Tangent Line

Touches at one point

has same slope as our function

$$y = mx + b \quad (0, 1400) \quad w(0) = 1400 = b$$

$$m = w'(0) = \left. \frac{dw}{dt} \right|_{t=0} = \frac{1}{25} (w(0) - 300) = \frac{1}{25} (1100) = 44$$

5. At the beginning of 2010, a landfill contained 1400 tons of solid waste. The increasing function W models the total amount of solid waste stored at the landfill. Planners estimate that W will satisfy the differential equation $\frac{dW}{dt} = \frac{1}{25}(W - 300)$ for the next 20 years. W is measured in tons, and t is measured in years from the start of 2010.

(a) Use the line tangent to the graph of W at $t = 0$ to approximate the amount of solid waste that the landfill contains at the end of the first 3 months of 2010 (time $t = \frac{1}{4}$).

The Product

- Total of 7 Videos
- Total Run Time of 60:14
- 10 < 5 minute videos

Title	Length
Particle Motion	9:33
Modeling A Function Part 1	7:26
Modeling A Function Part 2	7:38
Differential Equations Part 1	11:00
Differential Equations Part 2	9:54
Regions Formed by Functions Part 1	8:02
Regions Formed by Functions Part 2	6:41

Evaluation

- Perfect?
- Useable?
- Productive?



Lets Try Something!



Start at 2:55

Reflection

- Goal?
- Next Time?



An abstract geometric design in the bottom-left corner of the slide. It consists of several overlapping, parallel lines in shades of green and grey, creating a sense of depth and movement. The lines are oriented diagonally, extending from the bottom-left towards the top-right.

Questions?

An abstract geometric design in the bottom-left corner of the slide. It consists of several overlapping lines and shapes in shades of green and grey, creating a sense of depth and movement. The lines are of varying thicknesses and are arranged in a way that suggests a corner or a fold in a piece of paper.

Thank You!