

AP Calculus AB – Unit 1 Outline – Review and Foundations

Monday 8/14	Today's Topic: Welcome to AP Calculus AB
Today, we will discuss our class expectations.	
Homework: Make sure you have the necessary materials for this class.	

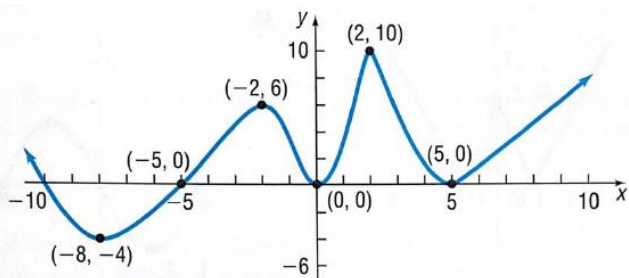
Tuesday 8/15	Today's Topic: Linear Functions <ol style="list-style-type: none"> 1. Find the slope of a line given two points. 2. Write an equation of a line. 3. Relationship between the slopes of parallel and perpendicular lines.
In-class examples:	
Ex.1 Write the equation for the line (point-slope form) through the point $(2,3)$ with slope $-\frac{3}{2}$.	
Ex. 2 Write the equation for the line (point-slope form) through $(-2,-1)$ and $(3,-4)$.	
Ex. 3 Write an equation for the line (point-slope form) through the point $(1,5)$ that is <ol style="list-style-type: none"> a) parallel to $2x + y = 4$ b) perpendicular to $2x + y = 4$ 	
Homework: Worksheet 1	

Wednesday 8/16	Today's Topic: Algebraic and Numeric Representations of Functions														
In-class examples:															
Algebraic:															
Ex. 1 If $f(x) = x^2 - 4x + 7$, evaluate: <ol style="list-style-type: none"> a) $f(3a)$ b) $f(x+h)$ c) $f(x+h) - f(x)$ d) $\frac{f(x+h) - f(x)}{h}$ 															
Ex. 2 Evaluate $y = \cos x$ when $x = \frac{\pi}{6}$.															
Ex. 3 Given $f(x) = x + 5$ and $g(x) = x^2 - 3$, find: <ol style="list-style-type: none"> a) $f(g(x))$ b) $g(f(x))$ c) $g(g(x))$ 															
Ex. 4 Piecewise Defined Function: $f(x) = \begin{cases} 2x+1, & x \leq 0 \\ \sin x, & x > 0 \end{cases}$, evaluate: <ol style="list-style-type: none"> a) $f(-4)$ b) $f(0)$ c) $f(\pi)$ 															
Numeric:															
Ex. 5 $f(x)$ is a continuous function with domain all real numbers. Selected values of $f(x)$ are given in the table below: <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 5px;">x</td> <td style="padding: 5px;">-4</td> <td style="padding: 5px;">-1</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">5</td> <td style="padding: 5px;">8</td> <td style="padding: 5px;">11</td> </tr> <tr> <td style="padding: 5px;">$f(x)$</td> <td style="padding: 5px;">-5</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">4</td> <td style="padding: 5px;">-1</td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">6</td> </tr> </table> <ol style="list-style-type: none"> a) What is the least number of times for which the graph of $f(x)$ crosses the x-axis? Explain your reasoning. b) Evaluate $\frac{f(11) - f(-4)}{11 - (-4)}$...we will use this formula a lot this year. 		x	-4	-1	2	5	8	11	$f(x)$	-5	2	4	-1	1	6
x	-4	-1	2	5	8	11									
$f(x)$	-5	2	4	-1	1	6									
Homework: Worksheet 2															

Thursday 8/17

Today's Topic: Functions – Graphical Representation

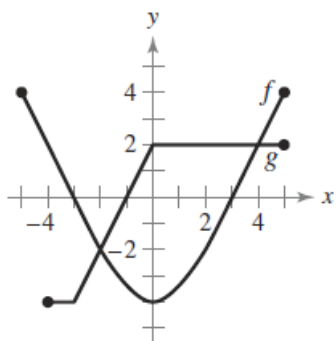
In-class examples:



Ex. 1

The graph of a function, $f(x)$, is shown at left. Answer the following questions.

- Determine $f(0)$ and $f(2)$?
- Is $f(-6)$ positive or negative? Explain your reasoning.
- On what interval(s) is $f(x)$ increasing? Explain.
- For which x -values does $f(x) = 0$?
- For how many x -values does $f(x) = 4$? Explain.
- Find the average rate of change of $f(x)$ on $[-8, 2]$.



Ex. 2

Use the graphs of f and g to answer the following questions:


- Evaluate $g(f(3))$.
- For what value(s) of x does $f(x) = g(x)$?
- For what value(s) of x is $f(x) > g(x)$?

Homework: Worksheet 3


Friday 8/18

Today's Topic: Graphing Calculator Basics

In-class examples:

 **Ex. 1** Consider the following function: $f(x) = x^3 - 4x^2 - x + 5$

- Graph $f(x)$
- Evaluate $f(3)$; $f(3.21)$; $f\left(-\frac{2}{7}\right)$
- Find all the zeroes of $f(x)$
- Find the coordinates of the maximum points.
- Find the coordinates of the minimum points.

 **Ex. 2** Given $f(x) = x^3 - 4x^2 - x + 5$ and $g(x) = 2x - 1$. Find all values of x , such that $f(x) = g(x)$.

Homework: Worksheet 4

Monday 8/21	Today's Topic: Solving Equations
In-class examples:	
Ex. 1 Find the zeroes of $f(x) = 3x^2 - 5x + 2$	
Ex. 2 Find the zeroes of $f(x) = e^{x-3} - 4$	
Ex. 3 Find the zeroes of $f(x) = \cos 2x$ in $[0, 2\pi)$.	
Ex. 4 Find the zeroes of $f(x) = \ln x - 3$	
Homework: Worksheet 5	

Tuesday 8/22	Today's Topic: Intro to Calculus: Approximating Slope and Area														
In-class Examples:															
Ex. 1 The graph of $f(x)$ is shown in the figure below.															
<ul style="list-style-type: none"> a) Use the graph to estimate the slope of $f(x)$ at the precise moment that $x = 2$. b) Estimate the area above the x-axis and under the graph of $f(x)$ on the interval $[1, 4]$. 															
Ex. 2 Given $f(x) = x^2 + 7$:															
<ul style="list-style-type: none"> a) approximate the slope of the curve when $x = 3$. b) estimate the area above the x-axis and under the graph of $f(x)$ on the interval $[2, 5]$. 															
Ex. 3 $f(x)$ is a continuous function with domain all real numbers. Selected values of $f(x)$ are given in the table below:															
<table border="1"> <tr> <td>x</td> <td>-4</td> <td>-1</td> <td>2</td> <td>5</td> <td>8</td> <td>11</td> </tr> <tr> <td>$f(x)$</td> <td>-5</td> <td>2</td> <td>4</td> <td>-1</td> <td>1</td> <td>6</td> </tr> </table>		x	-4	-1	2	5	8	11	$f(x)$	-5	2	4	-1	1	6
x	-4	-1	2	5	8	11									
$f(x)$	-5	2	4	-1	1	6									
<ul style="list-style-type: none"> a) Approximate the slope of $f(x)$ when $x = 6$. b) Approximate the area between the x-axis and the graph of $f(x)$ when $[-1, 8]$. 															
Homework: Worksheet 6															

Wednesday 8/23	Today's Topic: Review
In-class examples: None	
Homework: Unit 1 Review	

Thursday 8/24	Today's Topic: Exam
In-Class Example: None	
Homework: Be sure to bring your calculator to school tomorrow!	