

AP Calc Warm Up – 10/14/10

Name: _____ Period: _____

1) Find $f'(x)$ for the following functions.

a. $f(x) = 4x$

b. $f(x) = x^3$

c. $f(x) = 7x^2$

d. $f(x) = 4$

e. $f(x) = -3x^2 + 5x - 7$

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AP Calc – Review for Q1 Interim

Name: _____ Date: _____ Period: _____

Concept – Students will know which objectives to review for the Q1 Interim

Q1 Objectives

Students will be able to determine if a function is strictly increasing, decreasing or neither

Students will be able to identify intervals on which functions are increasing and decreasing (by graph) and identify maxima and minima

Students will be able to identify if a function is continuous from its graph.

Students will be able to sketch a piecewise function given a function or construct an equation of a piecewise function given a graph

Students will be able to find a limit given its graph

Students will be able to find the limit of a function given its equation (including using a graphing calculator).

Students will be able to find limits as x approaches infinity.

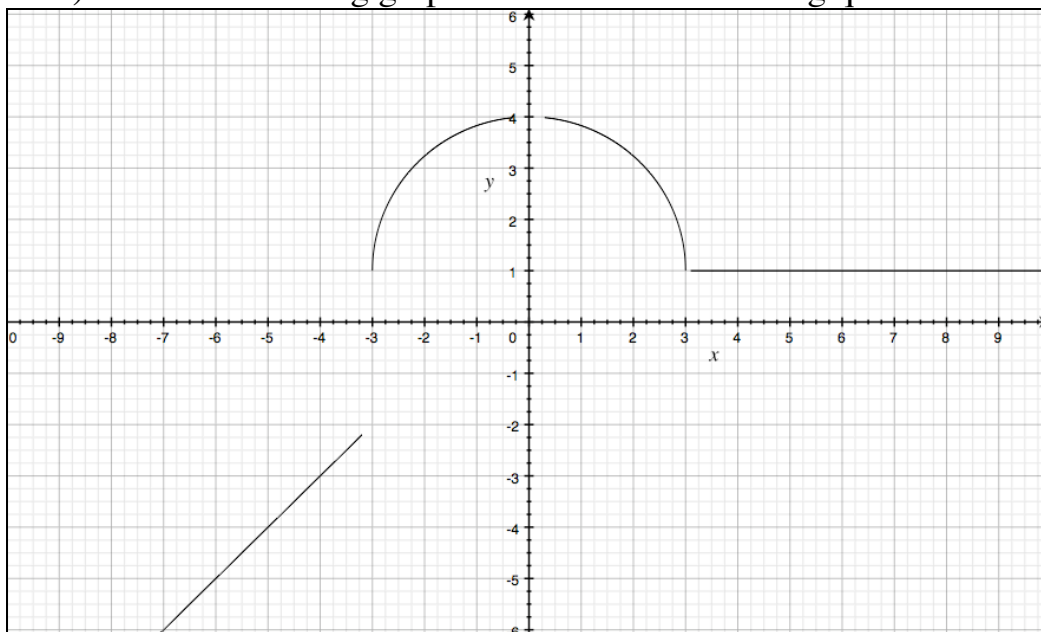
Students will be able to find left and right hand limits.

Students will be able to find average velocity given the graph, table or equation of a function of position versus time.

Students will be able to find the derivative of a function at a given x -value using the limit definition of the derivative

Students will be able to find the derivative of a polynomial function

1) Use the following graph to answer the following questions:



a. $\lim_{x \rightarrow 0} f(x) =$

b. $\lim_{x \rightarrow -5} f(x) =$

c. $\lim_{x \rightarrow -3} f(x) =$

d. $\lim_{x \rightarrow -3^-} f(x) =$

e. $\lim_{x \rightarrow -3^+} f(x) =$

2) Find the following limits:

a. $\lim_{x \rightarrow 4} 3x^2 - 4x - 10 =$

b. $\lim_{x \rightarrow 3} \frac{x^2 - x - 6}{x + 2} =$

c. $\lim_{x \rightarrow -2} \frac{x^2 - x - 6}{x + 2} =$

d. $\lim_{x \rightarrow -2} \frac{x^2 + 5x - 6}{x + 2} =$

e. $\lim_{x \rightarrow 0} \frac{\sin x}{x} =$

f. $\lim_{x \rightarrow 0} \frac{1}{x} =$

g. $\lim_{x \rightarrow \infty} \frac{1}{x} =$

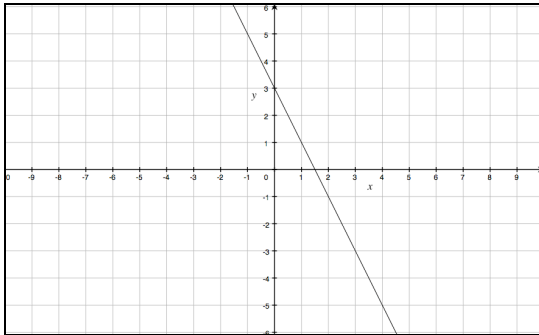
h. $\lim_{x \rightarrow -\infty} 2^x =$

i. $\lim_{x \rightarrow \infty} \frac{3x^2 + 4x - 6}{x + 2} =$

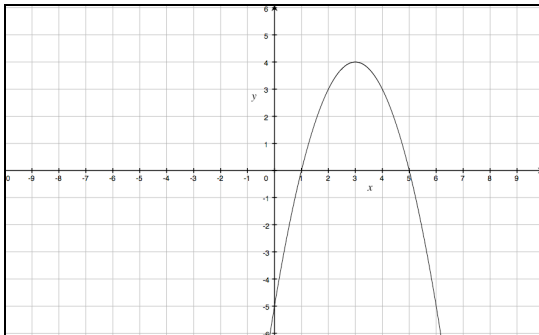
j. $\lim_{x \rightarrow \infty} \frac{9x^3 + 4x - 6}{3x^3 - 5x^2 + 9x + 2} =$

k. $\lim_{x \rightarrow \infty} \frac{3x^2 + 4x - 6}{x^3 + 2} =$

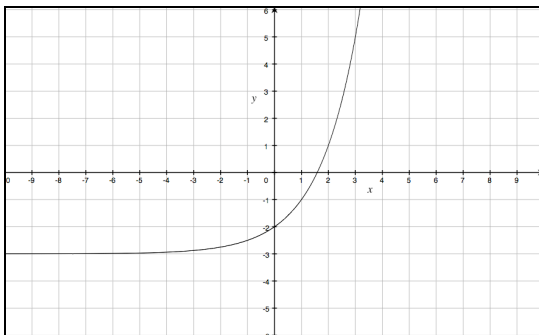
1) Label the following functions as strictly increasing, strictly decreasing or neither.



a) _____



b) _____



c) _____

- 2) The following table represents the x and y -values for the function $f(x)$. Choose the ONE answer for the missing value that would make $f(x)$ strictly decreasing.

x	$f(x)$
-1	9
0	6
1	3
2	
3	-3

- a. 3
- b. -3
- c. 1
- d. 5

- 3) The following table represents the x and y -values for the function $f(x)$. Choose the ONE answer for the missing value that would make $f(x)$ neither strictly increasing nor strictly decreasing.

x	$f(x)$
1	-5
2	-3
3	
4	1
5	3

- a. 2
- b. 5
- c. -4
- d. -2

4) Translate the following verbal descriptions into interval notation (you have your choice between greater than less than and brackets)

a. x is less than 5

b. x is between 4 and 9 not including 4 and 9

c. x is between -8 and 4 not including -8 but including 4

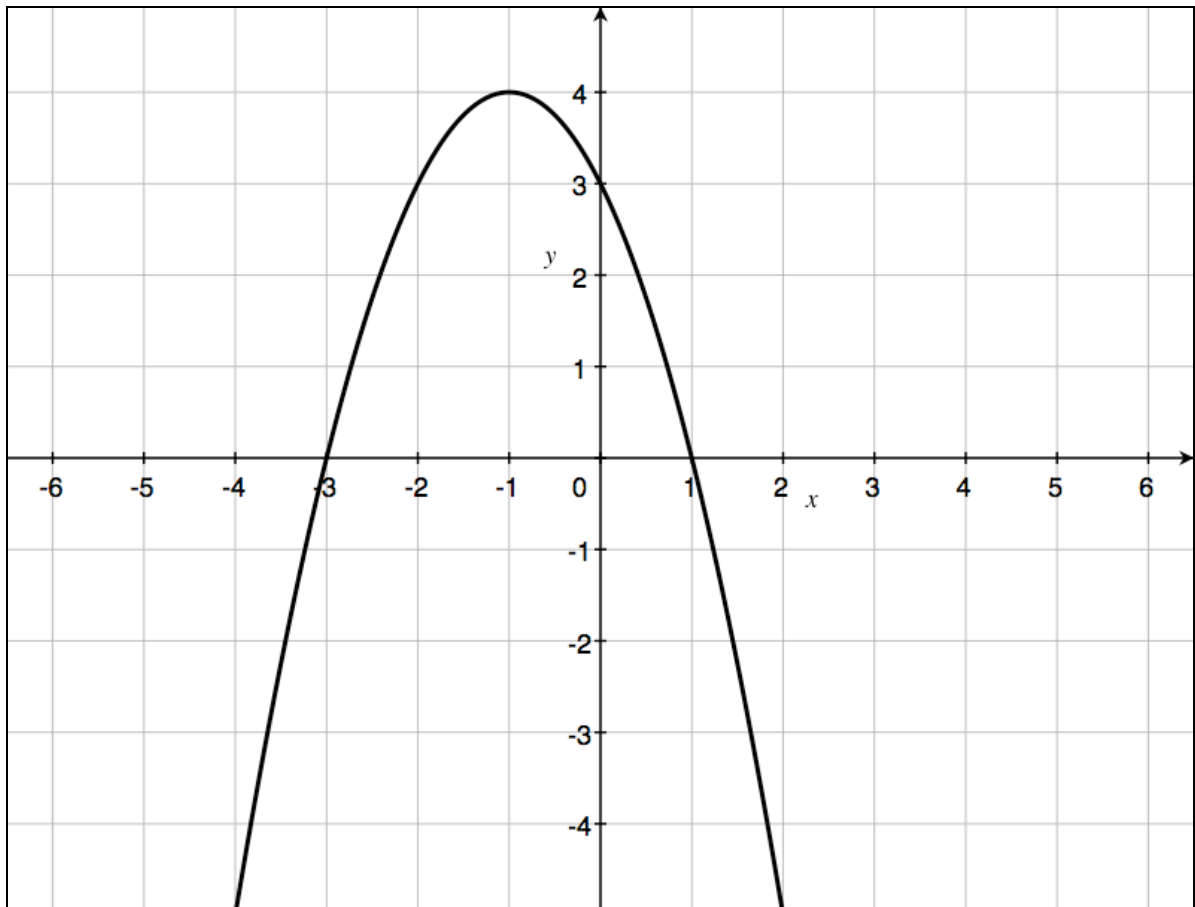
5) Translate the following interval notation into a verbal description.

d. $x > 2$

e. $[-10, 15]$

f. $(9, 11]$

- 6) State the intervals over which the following function is increasing or decreasing. State whether the function has any maxima and/or minima.



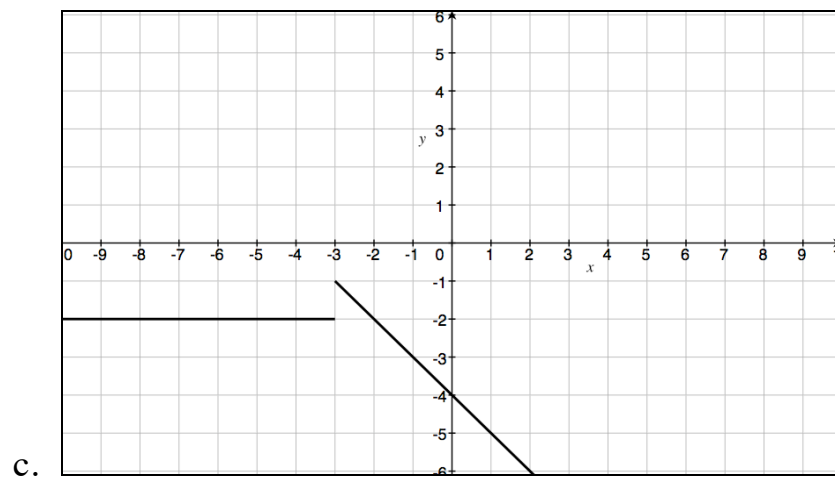
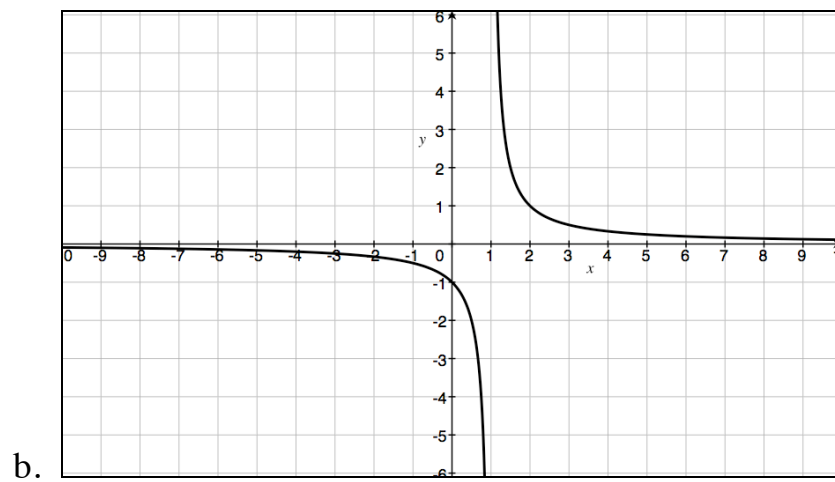
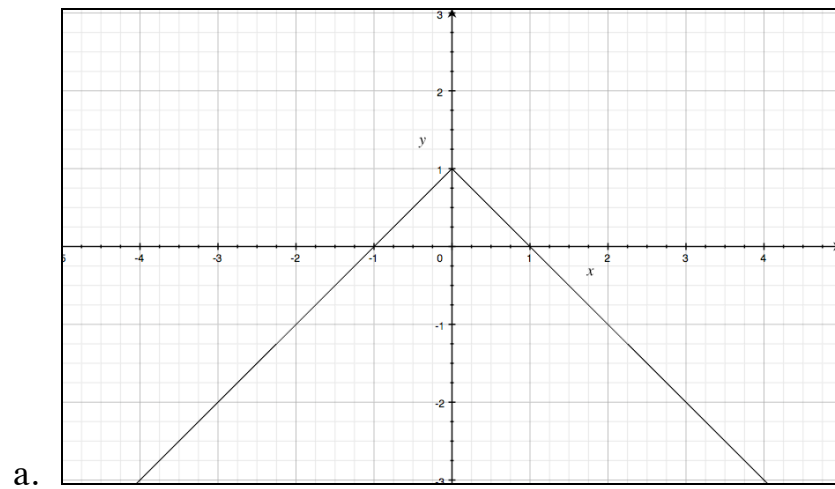
Increasing:

Decreasing:

Maxima:

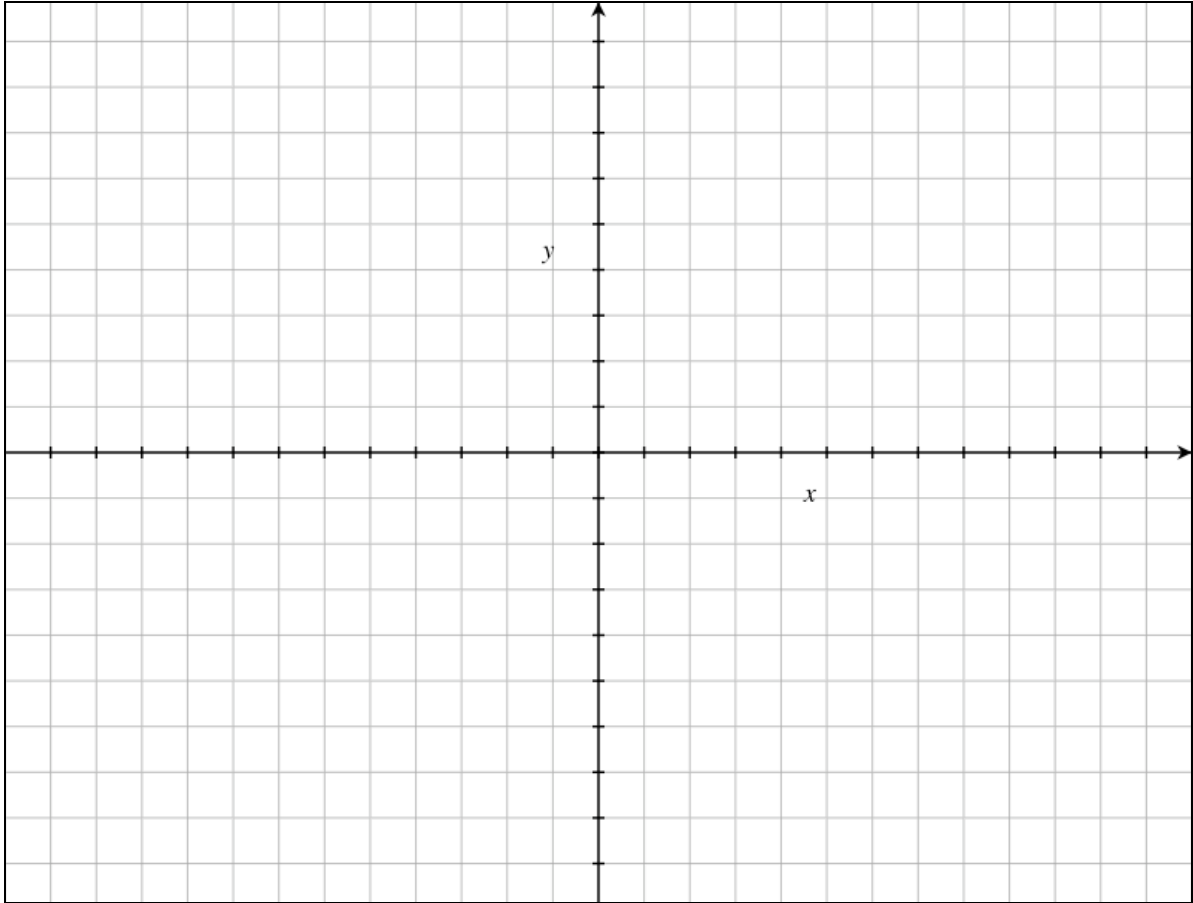
Minima:

7) State whether each function is continuous or not continuous. If it is not continuous state where it has a discontinuity.

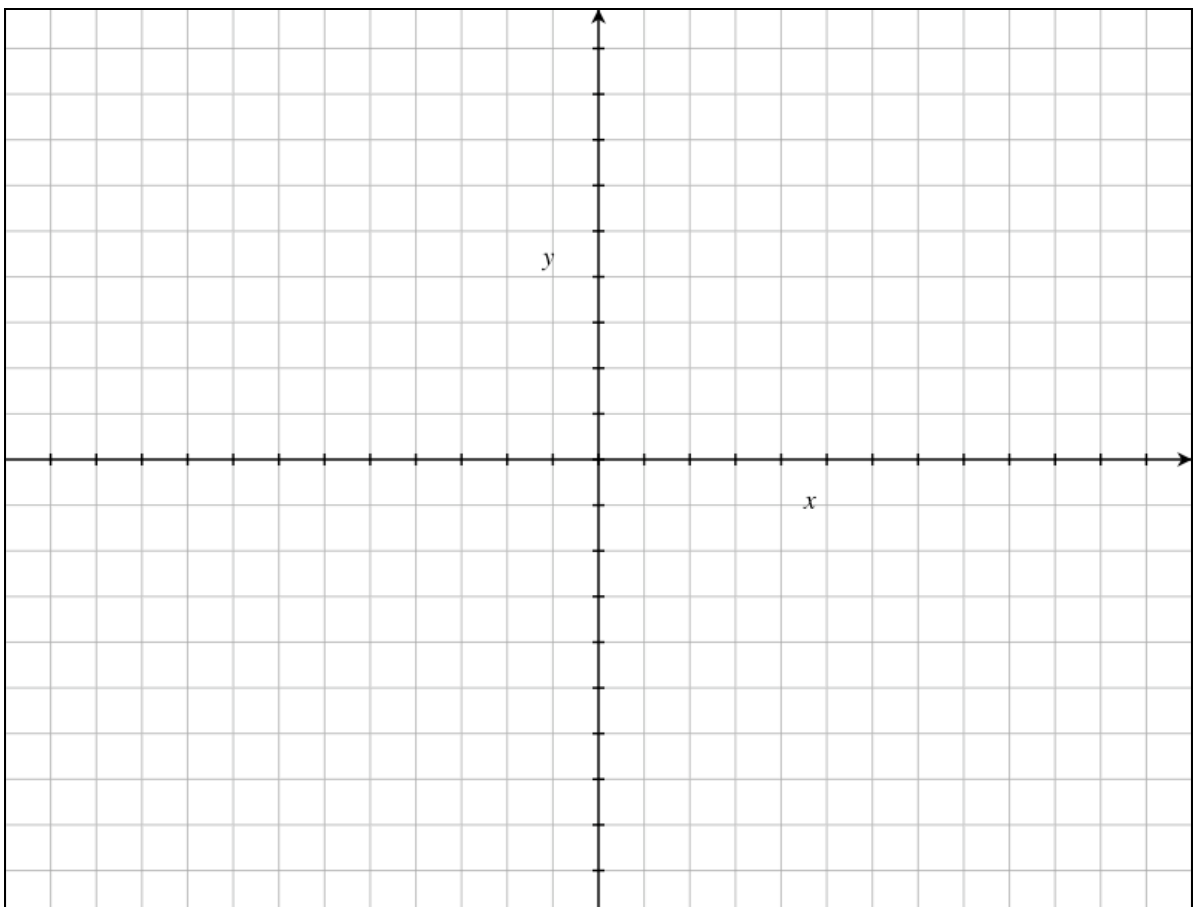


Sketch a graph the following piecewise functions.

$$1) f(x) = \begin{cases} -4, & x < 1 \\ 2x - 6, & 1 \leq x < 5 \end{cases}$$



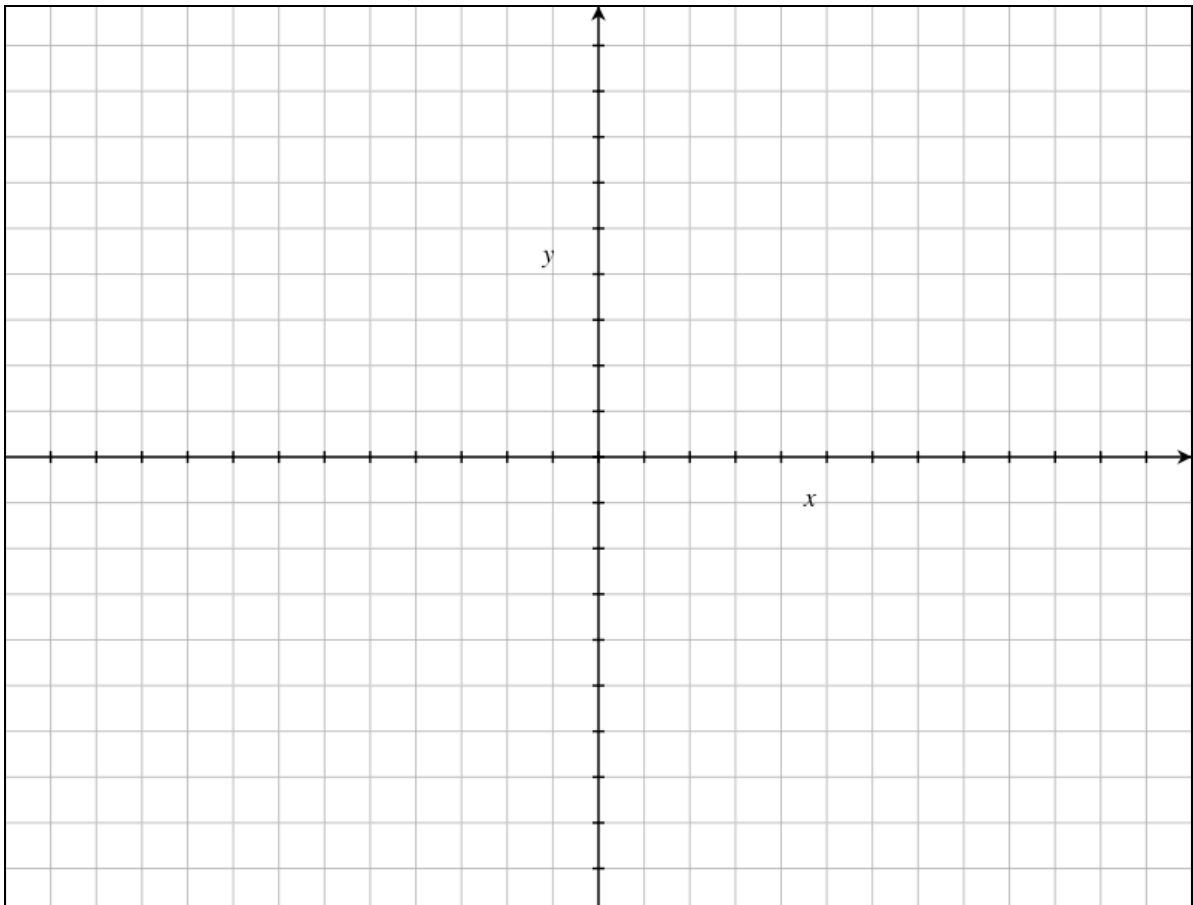
$$2) f(x) = \begin{cases} -x+4, & x < -2 \\ 8, & -2 \leq x < 2 \\ 3, & 2 \leq x \leq 9 \end{cases}$$



8) Consider the following piecewise function:

$$f(x) = \begin{cases} 3x + a, & x \leq 3 \\ -2x + 8, & x > 3 \end{cases}$$

- If $a=9$ is the function continuous?
- Find a value of a that makes the function continuous.
- Sketch a graph the resulting function.
- State the intervals on which the resulting function is increasing/decreasing.
- State where the resulting function has any local maxima and/or minima.



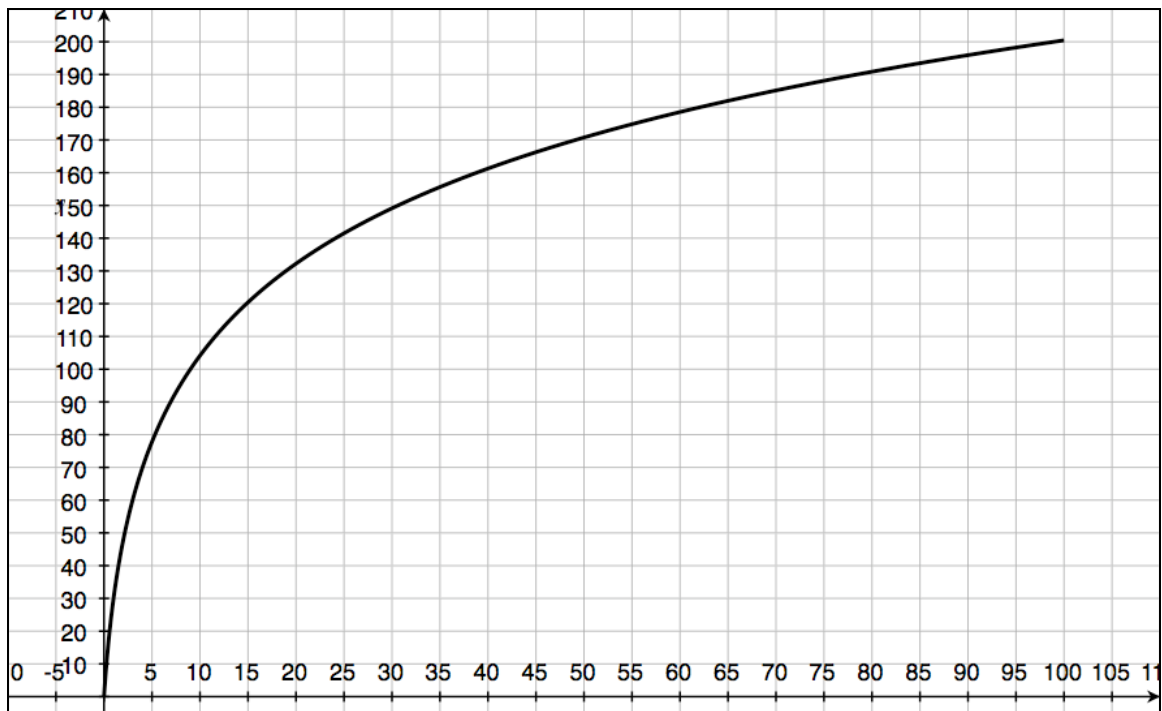
- 1) The following equation represents the height in meters of a watermelon dropped off of the roof of the building.

$$f(x) = -x^2 + 25$$

- a. What is the average velocity of the watermelon on the interval $[1,3]$?

- b. What is the average velocity of the watermelon on the interval $[2,5]$?

- 1) Mr. Monte-Sano rides his bike in a straight line and keeps track of his distance from where he started (in meters) versus time (in seconds).



- Is the function increasing, decreasing or neither?
- Find Mr. Monte-Sano's average velocity between $t = 0$ and $t = 100$?
- Find Mr. Monte-Sano's average velocity between $t = 0$ and $t = 30$?
- Is Mr. Monte-Sano's average velocity greater over the interval $[0, 100]$ or the interval $[0, 30]$?

- 1) Find the derivative of $f(x) = x^2 + 3x - 5$ at $x=4$ using the limit definition of the derivative.

- 1) Find $f'(x)$ following functions.

a. For $f(x) = x^2$ find $f'(x)$

b. For $f(x) = 9x - 3$ find $f'(x)$

c. For $f(x) = 3x^2 - 4x + 5$ find $f'(x)$

AP Calc – Exit Slip – 10/14/10

Name: _____

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- 1) Consider the following problem (but do not solve it, yet):

The function $f(x) = 3x^2 - 4x + 5$ represents the distance that a baseball has traveled after being hit by a baseball player where x is measured in seconds and $f(x)$ is measured in feet. What is the velocity of the baseball as measured in feet per second at $x=4$?

Which objective best matches this question?

- a) Students will be able to calculate average rates of change given the equation of a nonlinear function.
- b) Students will be able to use the limit definition of the derivative in order to find the derivative of a function.
- c) Students will use limits in order to determine if a function is continuous.
- d) Students will use the derivative to find instantaneous velocity given the equation of a nonlinear function.

Solve the problem below.