Bell Ringer

Thursday 10/25

1. What is factored form? What information is easily found in factored form?

$y = a(x-p)(x-q)$

2. If 3 *and* -5 are zeros of a quadratic function, what are the factors of the same function?

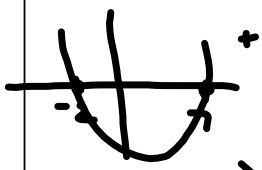
$x = -5$ $x = 3$

$+5 \quad +5$ $-3 \quad -3$

$x+5=0$ $x-3=0$

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

3. If -2 *and* 7 are zeros of a quadratic function, what is the function in STANDARD FORM?



$x = -2$ $x = 7$

$+2 \quad +2$ $-7 \quad -7$

$x+2=0$ $x-7=0$

$(x+2)(x-7)$

	x^2	$2x$
x		
-7	$-7x$	14

$y = x^2 - 5x - 14$

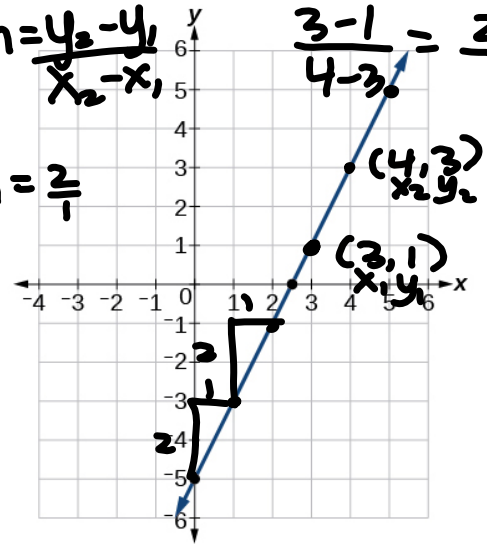
Green ws Applications DAY 1 Due today!!!

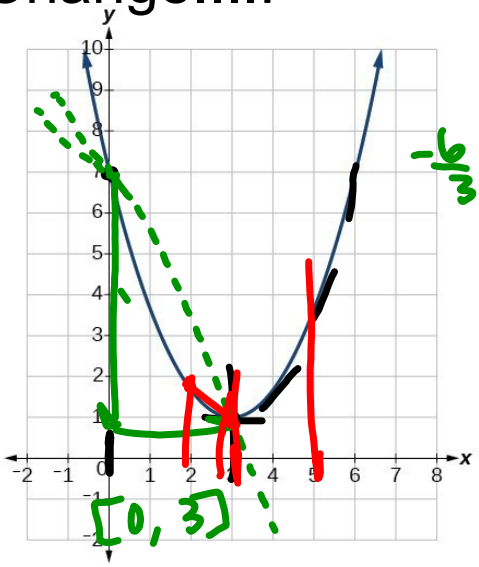
-cross off #6
-check key online if you haven't yet

Average Rate of Change....!

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $\frac{3-1}{4-3} = \frac{2}{1}$

$m = \frac{2}{1}$





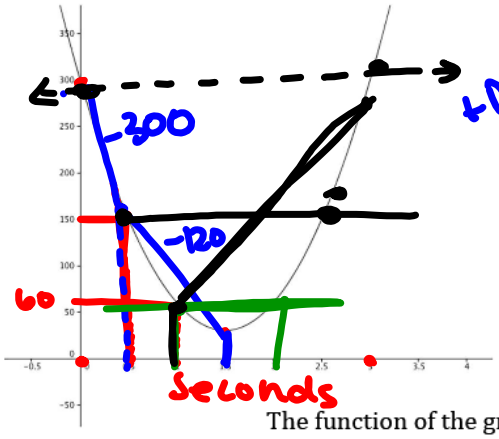
$\frac{-6}{3} = -2$

Notes: Average Rate of Change (ARC) $= \frac{f(b)-f(a)}{b-a}$

a & b are x values of interval

Average Rate of change: The slope of the line connecting any two points on a curve

The graph below models the height of a bungee jumper in feet over the time interval of three seconds [0,3]. The lowest the jumper gets is 30 ft. above the ground. Use values on the graph or use the equation for the function to fill out the table. Then using your table answer the questions below.



t	$f(t)$
0	300
.5	150
1	60
1.5	30
2	60
2.5	150
3	300

x y

a f(a) 300

b f(b) 150

time height

height

The function of the graph is $f(t) = 120t^2 - 360t + 300$

Find the average rate of change (ARC) for each of the given intervals.

Timer Interval	Average rate of change
0 sec to .5 sec	$\frac{150-300}{.5-0} = \frac{-150}{.5} = -300$
.5 sec to 1.5 sec (a, b)	$\frac{f(1.5)-f(.5)}{1.5-.5}$ $\frac{30-150}{1} = -120$
[1, 2] (a, b)	$\frac{f(2)-f(1)}{2-1} = \frac{60-60}{1} = 0$
[1, 3] (a, b)	$\frac{f(3)-f(1)}{3-1} = \frac{300-60}{3-1} = \frac{240}{2} = 120$

Find an interval that will produce an ARC of 0. Why/when would this occur, different then the one in the table?

[.5, 2.5] [0, 3]

Find the average rate of change for the given equation $h(t) = -9t^2 + 45t + 3$ for a soccer ball using the following time intervals

a) [1,2] (a, b) $\frac{57-39}{2-1} = \frac{+18}{1}$

b) [2,4] (a, b) $\frac{f(4)-f(2)}{4-2}$ $\frac{-18}{2}$ $h(4) = 39$

c) [4,6] (a, b)

+18 −9 −45

$h(2) = -9(2)^2 + 45(2) + 3 = 57$

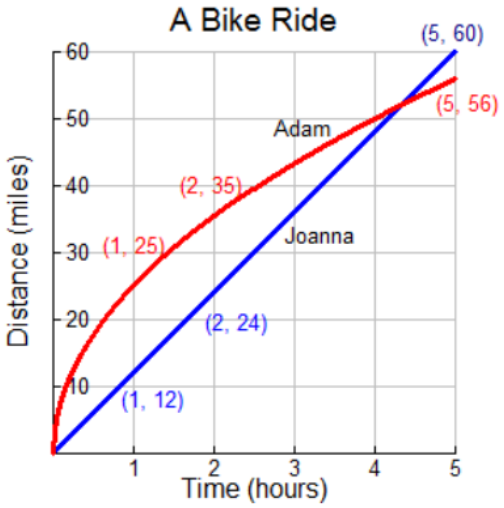
$h(1) = -9(1)^2 + 45(1) + 3 = 39$

$\frac{f(6)-f(4)}{6-4} = -\frac{51-39}{6-4} = -\frac{90}{2} = -45$

Average Rate of Change

Name_____**Hr**____

1. Adam and Joanna both rode their bikes for five hours last weekend while training for a race. The graph shows their distance traveled over the five hours as a function of time.



a. Describe Joanna's speed during the 5-hour bike ride.

b. Describe Adam's speed during the 5-hour bike ride.

c. Find each rider's average speed over the 5-hour time interval.

d. Who had the fastest average speed?

e. Find each rider's average speed over the interval [0,1]

f. Who had the fastest average speed over this interval?

g. Find Adam's average speed over the interval [1, 2].

h. Was Adam traveling faster over the interval [0,1] or [1, 2]?

i. How does the graph show this?

2. An object is dropped from a 256-foot bridge into the water below. The height of this object with respect to time can be modeled by the function $h(t) = -16t^2 + 256$.

a. Use the equation to evaluate the following values of t.

$h(0)$ =

$h(1)$ =

$h(2)$ =

b. Find the average rate of change over the interval [0, 1].

c. Find the average rate of change over the interval [1, 2].

d. Is the object traveling the same speed at every point in its descent? Explain.

e. Explain what is happening to the average rate of change of the object as *t* increases. Why is this happening?

f. If the speed of the object is increasing as it falls, why is the average rate of change negative over the interval?

3. The following tables show the distance traveled by three different cars over five seconds.

Car 1	
Time (s)	Distance (ft)
0	0
1	4
2	7
3	10
4	13
5	16

Car 3	
Time (s)	Distance (ft)
0	0
1	3
2	5
3	9
4	17
5	33

a. Using the above tables, compare the three cars and their positions after *t* seconds. Which car is traveling the fastest? Justify your answer.

b. What is the average rate of change for each car over the interval [0, 2]?

c. What is the average rate of change for each car over the interval [3, 5]?

d. Think about it again. Which car is traveling the fastest?

A manufacturer of air conditioners has daily production costs of $C = 0.4x^2 - 8x + 500$ where C is the total cost, in dollars, and x is the number of AC units produced.

A. How many fixtures should be produced daily to yield a minimum cost?

B. What is the minimum cost?

A manufacturer of air conditioners has daily production costs of $C = 0.4x^2 - 8x + 500$ where C is the total cost, in dollars, and x is the number of AC units produced.

What does it cost to produce 25 units in a day?

The height y (in feet) of a ball thrown by a child is represented by the equation below where x is the horizontal distance (in feet) from where the ball is thrown.

$$y = -\frac{1}{4}x^2 + 8x + 3$$

How high is the ball when it leaves the child's hand?

The height y (in feet) of a ball thrown by a child is represented by the equation below where x is the horizontal distance (in feet) from where the ball is thrown.

$$y = -\frac{1}{4}x^2 + 8x + 3$$

What is the maximum height the ball reaches?

The height y (in feet) of a ball thrown by a child is represented by the equation below where x is the horizontal distance (in feet) from where the ball is thrown.

$$y = -\frac{1}{4}x^2 + 8x + 3$$

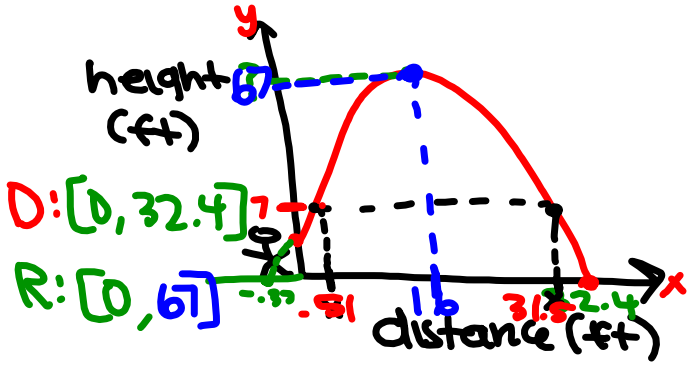
How far from the child does the ball strike the ground?

The height y (in feet) of a ball thrown by a child is represented by the equation below where x is the horizontal distance (in feet) from where the ball is thrown.

$$y = -\frac{1}{4}x^2 + 8x + 3$$

$a = -\frac{1}{4} = -.25$
$b = 8$
$c = 3$

What is a realistic domain and range for the equation?



D: [0, 32.4]
R: [0, 67]

(.51, 7) (31.5, 7)

$\frac{-8 \pm \sqrt{8^2 - 4(-\frac{1}{4})(3)}}{2(-\frac{1}{4})}$

$\frac{-8}{2(-\frac{1}{4})}$

$-\frac{1}{4}(16)^2 + 8(16) + 3$
$= 67$

The height y (in feet) of a ball thrown by a child is represented by the equation below where x is the horizontal distance (in feet) from where the ball is thrown.

$$y = -\frac{1}{4}x^2 + 8x + 3$$

At a height of 7 feet, how far has the ball gone?

$a = -\frac{1}{4}$
$b = 8$
$c = -4$

$$0 = -\frac{1}{4}x^2 + 8x - 4$$