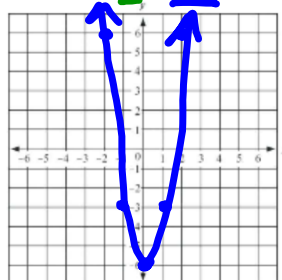


Grab a Week #12 Packet Bell Ringer

Monday 11/4

Describe the transformations to the graph of $f(x) = x^2$ on the space provided, then graph the function.

$$f(x) = 3x^2 - 6$$



Transformations:

Down 6
Stretch by 3

Correct Day 2 - Quadratic Piecewise Functions

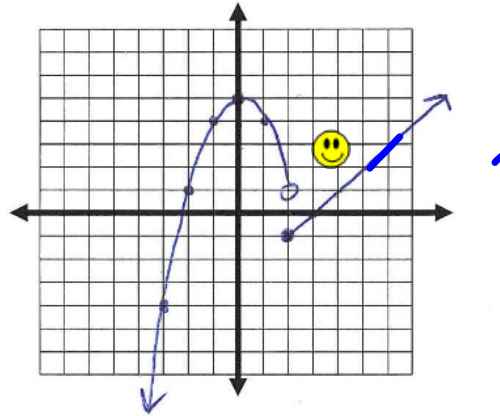
* Day 2 - Quadratic Piecewise Functions: Graphing, Writing and Applications

Name _____ Hour _____

Sketch each piecewise function. Find the domain and range for each piecewise function. Then, evaluate the graph at the specified domain value.

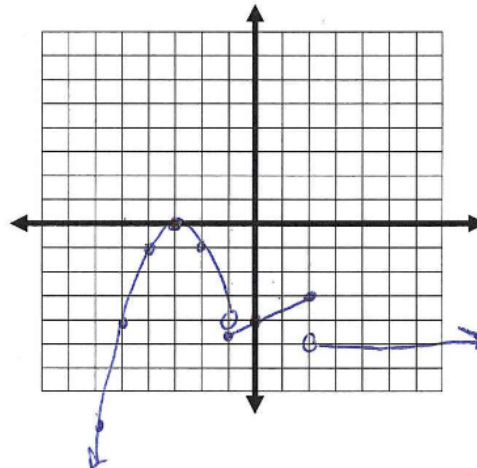
1.
$$f(x) = \begin{cases} -x^2 + 5 & x < 2 \\ x - 3 & x \geq 2 \end{cases}$$

 Domain: $(-\infty, 2)$
 Range: $(-\infty, \infty)$
 $f(-3) = -4$
 $f(0) = 5$
 $f(2) = -1$



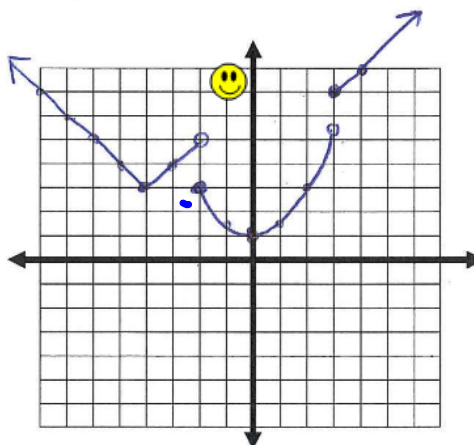
2.
$$f(x) = \begin{cases} -(x+3)^2 & x < -1 \\ \frac{1}{2}x - 4 & -1 \leq x \leq 2 \\ -5 & x > 2 \end{cases}$$

 Domain: $(-\infty, \infty)$
 Range: $(-\infty, 0]$ 😊
 $f(-2) = -1$
 $f(2) = -3$
 $f(4) = -5$

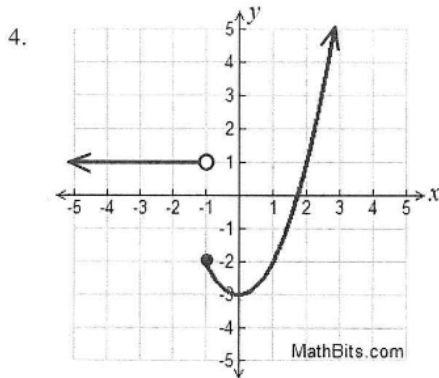


3.
$$f(x) = \begin{cases} |x+4| + 3 & x < -2 \\ \frac{1}{2}x^2 + 1 & -2 \leq x < 3 \\ x + 4 & x \geq 3 \end{cases}$$

 Domain: $(-\infty, \infty)$
 Range: $[1, \infty)$
 $f(-2) = 3$
 $f(3) = 7$ 😊

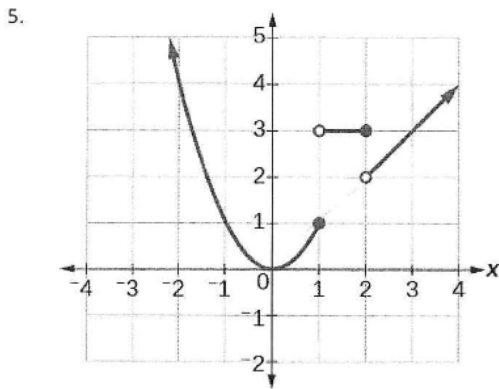


Write a piecewise function for each graph and give the domain and range.



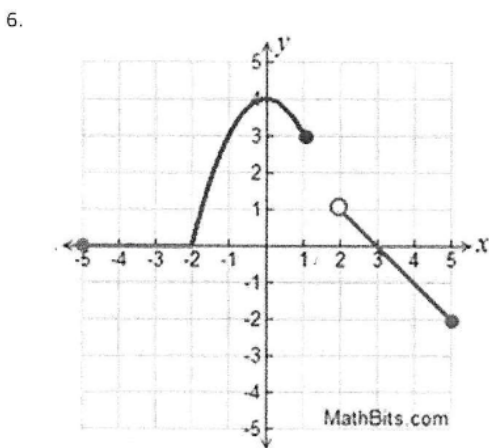
$$f(x) = \begin{cases} 1, & x < -1 \\ x^2 - 3, & x > -1 \end{cases}$$

Domain $(-\infty, \infty)$ or \mathbb{R} Range $[-3, \infty)$
 $y \geq -3$



$$f(x) = \begin{cases} x^2, & x \leq 1 \\ 3, & 1 < x \leq 2 \\ x, & x > 2 \end{cases}$$

Domain $(-\infty, \infty)$ or \mathbb{R} Range $[0, \infty)$
 $y \geq 0$



$$f(x) = \begin{cases} 0, & -5 \leq x < -2 \\ -x^2 + 4, & -2 \leq x \leq 1 \\ -x + 3, & x > 2 \end{cases}$$

Domain $[-5, 1] \cup (2, 5]$ Range $[-2, 4]$
 $-5 \leq x \leq 1$ and $2 < x \leq 5$ $-2 \leq y \leq 4$

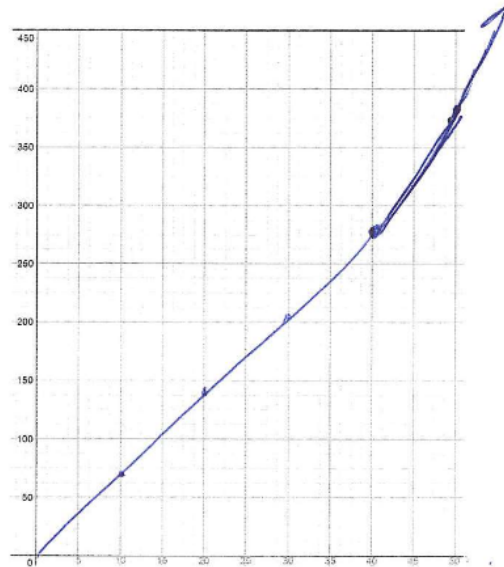
skipped...

7. You have a summer job that pays time and a half for overtime. (i.e. if you work more than 40 hours). After that it is 1.5 times your hourly rate of \$7.00/hr.

a. Write a piecewise function that gives your weekly pay P in terms of the number of hours you worked h.

$$P(h) = \begin{cases} 7x, & 0 < x \leq 40 \\ 10.5x - 140, & x > 40 \end{cases}$$

b. Graph your piecewise function.



c. How much will you make if you work 45 hours?

$$10.5(45) - 140 = \$382.50$$

10	70
20	140
30	210
40	280
50	
60	

$$280 + 10.5(10) = 280 + 105 = 385$$

$$280 + 10.5(20) = 490$$

$$y - 385 = 10.5(x - 50)$$

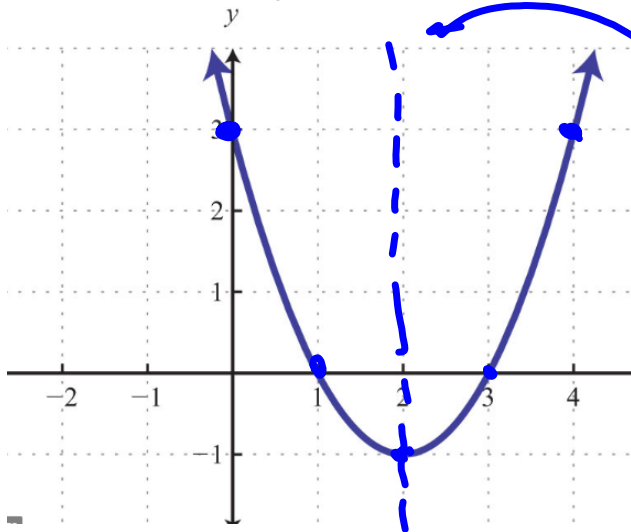
$$y - 385 = 10.5x - 525 + 385$$

$$y = 10.5x - 140$$

Average Rate of Change ws due tomorrow!
Week #11 Packet due tomorrow!

Pass out Ch 3 notes...

Identify parts...

Vertex: $(2, -1)$ Axis of Sym: $x = 2$

Max or min: min

y-int: $(0, 3)$ x-int(s): $(1, 0); (3, 0)$

Vertex form:

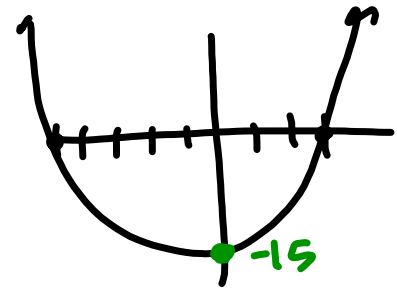
 $f(x) = (x - 2)^2 - 1$

f(2):

f(4):

Write the quadratic equation in standard form for a parabola with x-intercepts 3 and -5

$$\begin{array}{l}
 x = 3 \qquad x = -5 \\
 \frac{x-3}{x-3} = 0 \qquad \frac{x+5}{x+5} = 0 \\
 y = (x-3)(x+5)
 \end{array}$$



$$y = x^2 + 5x - 3x - 15$$

$$y = x^2 + 2x - 15$$

x-ints 7 and $x = -\frac{1}{2}$ - Write in standard form

$$\begin{array}{r} x = 7 \\ -7 \quad -7 \\ (x-7) = 0 \end{array}$$

$$(x-7)(2x+1)$$

$$2(x^2 + \frac{1}{2}x - 7x - \frac{7}{2})$$

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

$$\underline{2x^2 - 13x - 7}$$

$$2(x) = (-\frac{1}{2})^2$$

$$\begin{array}{r} 2x = -1 \\ +1 \quad +1 \\ (2x+1) = 0 \end{array}$$

$$y = 2x^2 - 13x - 7$$

	x	-7
$2x$	$2x^2$	$-14x$
$+1$	x	-7

Write the quadratic equation in vertex form for a parabola that crosses the point (1, -2) and has a vertex of (3, 5)

$$-2 = a(1-3)^2 + 5$$

$$-2 = 4a + 5$$

$$-7 = 4a$$

$$a =$$

$$h = 3$$

$$k = 5$$

$$y = -\frac{7}{4}(x-3)^2 + 5$$

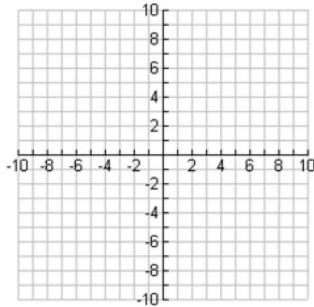
due Wednesday - do # 2 and 5 together

Applications of Quadratics From Graphs

Name: _____ Hr: _____

Given the function below find the following.

1. $y = -2x^2 + 8x - 10$

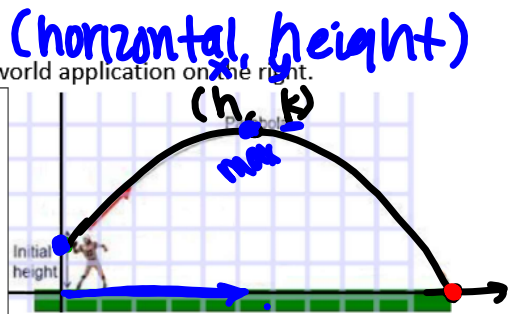


- A) Vertex Form _____
- B) Vertex _____
- C) Axis of Symmetry _____
- D) Max/Min _____
- E) x- intercept _____
- F) y-intercept _____
- G) Domain and Range _____
- H) $f(1)$ _____
- I) Sketch the graph

2. Given the picture below, match the key features on the left to real world application on the right.

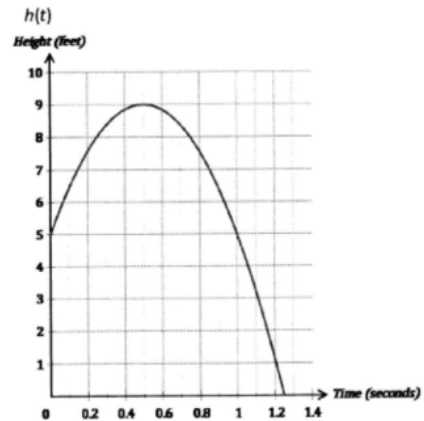
- A. x coordinate of the Vertex (h) S
- B. y coordinate of the Vertex (k) D
- C. y-intercept E
- D. x-intercept D
- E. Realistic domain A
- F. Realistic Range F
- G. $f(3)$: Substitute 3 in for x and find y C

- ~~X~~ The starting distance to the ending distance
- ~~X~~ Starting height
- ~~X~~ at a distance of 3 units how high is the ball
- ~~X~~ Maximum height
- ~~X~~ Where it lands
- ~~X~~ From ground level to the maximum height
- ~~X~~ How far it has gone at the maximum height



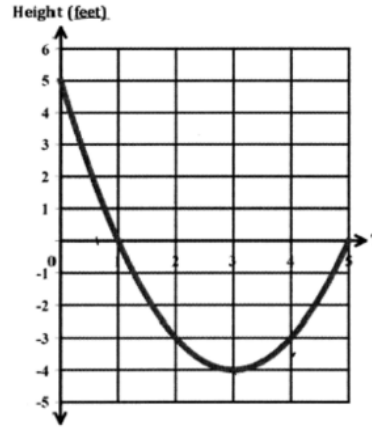
3. The graph $h(t)$ represents the height of a tennis ball thrown upward.

- a) Domain: f) $h(0.2)$
- b) Range: g) $h(1)$
- c) When does the tennis ball reach its maximum height? h) What does $h(0.2)$ represent?
- d) What is the maximum height of the tennis ball? i) What does the y-intercept represent? What is the y-intercept?
- e) $h(0)$ j) What does the x-intercept represent? What is the x-intercept?



4. The graph represents the height of an air-filled ball thrown in a swimming pool.

- a. Domain: _____ Range: _____
- b. What does the y-intercept represent?
- c. What does the x-intercept represent?
- d. When does the ball reach the minimum height?
- e. What is the minimum height?
- f. Estimate the time (in seconds) when the ball has a height of -2 feet?
- g. Estimate the height of the ball at 0.5 seconds?
- h. Estimate the height of the ball at 2 seconds?



5. The graph $h(t)$ represents the height of a rocket shot up into the sky. The equation is $h(t) = -16t^2 + 200t$. Use the graph as a guide to find what is asked below. Then use the equation to find the exact answers.

$-16(6.25)^2 + 200(6.25) = \frac{-200}{2(-16)} = \frac{-200}{-32}$ (time(sec), height)

- a. Find the Domain and write a sentence describing the meaning of the domain for $h(t)$.
- b. Find the Range and write a sentence describing the meaning of the range for $h(t)$.

$[0, 12.5]$

$[0, 625]$

- c. Find the y-intercept, and describe what it represents?

$(0, 0)$ rocket started on ground

- d. Find the x-intercepts, and describe what they represents?

$-16t^2 + 200t = 0$
 $-16t(t - 12.5) = 0$
 $\frac{-16t}{-16} = \frac{0}{-16} \quad t = 0 \quad t - 12.5 = 0$
 $t = 12.5$

- e. Find $h(8)$, and describe what it represents?

$-16(8)^2 + 200(8) = 576$ At 8 sec, rocket is 576 ft high

- f. Estimate the time(s) (in seconds) that the rocket is at a height of 450 feet.

$\approx 3 \text{ sec}, \approx 9.5 \text{ sec}$

- g. Find the vertex. Describe what the x coordinate and the y coordinate of the vertex represent.

$(6.25, 625)$ At 6.25 sec, reaches max height of 625 ft

