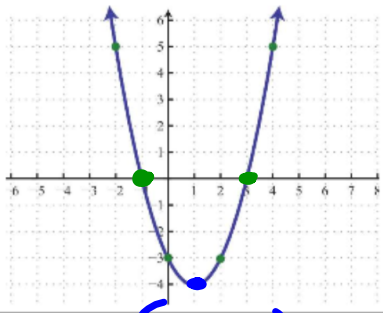
Bell Ringer

Wednesday 11/6

Consider the graph of the function of f



$(1,-4)$

What is the vertex? $(1,-4)$

Is it a max or a min? min.

What is the axis of symmetry? $x = 1$

Write the function f in vertex form? $y = (x-1)^2 - 4$

Find the zeros of the function. $(-1,0), (3,0)$

Find the y-intercept? $(0,-3)$

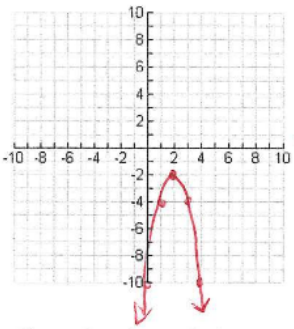
Identify the domain and range. $(-\infty, \infty)$ $[-4, \infty)$

correct Applications of Quadratics w Graphs ws

Applications of Quadratics From Graphs Name: Key Hr:____

Given the function below find the following.

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



$-2(x^2-4x+5)$

$-2(x \quad)(x \quad)$

doesn't factor

Vertex: $\frac{-8}{2(-2)} = \frac{-8}{-4} = 2$

$-2(2)^2+8(2)-10$

$-8+16-10=-2$

A) Vertex Form $y=-2(x-2)^2-2$

B) Vertex $(2,-2)$

C) Axis of Symmetry $x=2$

D) Max/Min max at -2

E) x- intercept none

F) y-intercept -10

G) Domain and Range $(-\infty,\infty),(-\infty,-2]$

H) f(1) -4

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) G

B. y coordinate of the Vertex (k) D

C. y-intercept B

D. x-intercept E

E. Realistic domain A

F. Realistic Range F

G. f(3): Substitute 3 in for x and find y C

a) The starting distance to the ending distance

b) Starting height

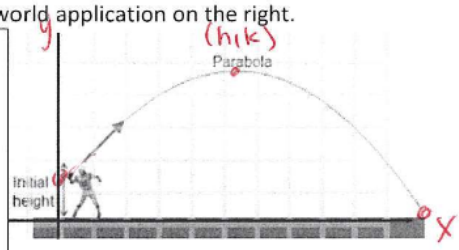
c) at a distance of 3 units how high is the ball

d) Maximum height

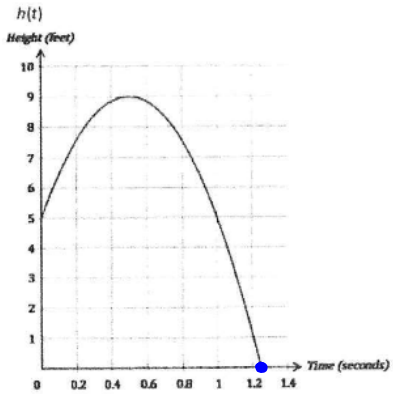
e) Where it lands

f) From ground level to the maximum height

g) 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: $[0, 1.25]$

b) Range: $[0, 9]$

c) When does the tennis ball reach its maximum height? 0.5 seconds

d) What is the maximum height of the tennis ball? 9 feet

e) $h(0)$ 5

f) $h(0.2)$ 7.5

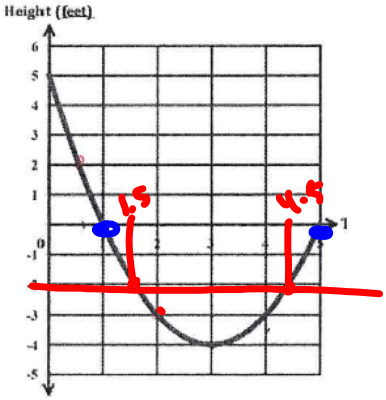
g) $h(1)$ 5

h) What does $h(0.2)$ represent? height of ball at 0.2 seconds

i) What does the y-intercept represent? What is the y-intercept? 5 ft - starting height of tennis ball

j) What does the x-intercept represent? What is the x-intercept how long the ball was in the air 1.25 seconds

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



a. Domain: [0,5] Range: [-4,5]

b. What does the *y*-intercept represent?
Starting height of ball

c. What does the *x*-intercept represent?
When ball was at pool surface

d. When does the ball reach the minimum height?
3 seconds

e. What is the minimum height?
-4 feet

f. Estimate the time (in seconds) when the ball has a height of -2 feet?
≈1.5 seconds, ≈4.5 sec

g. Estimate the height of the ball at 0.5 seconds?
≈ 2 feet

h. Estimate the height of the ball at 2 seconds?
-3 feet

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.

$-16t(t-12.5)=0$

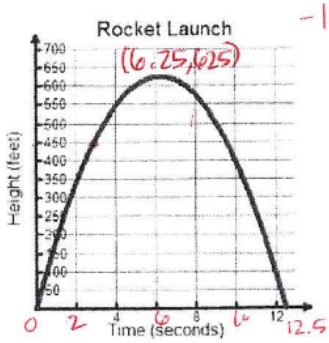
$-16t=0$

$t=0$

$t-12.5=0$

$t=12.5$

$\frac{-200}{2(-16)} = \frac{-200}{-32}$



a. Find the Domain and write a sentence describing the meaning of the domain for *h*(t).
[0,12.5] Rocket flew from 0-12.5 seconds

b. Find the Range and write a sentence describing the meaning of the range for *h*(t).
[0,625] reached a max height of 625 ft

c. Find the y-intercept, and describe what it represents?
(0,0) rocket started 0 ft high

d. Find the x-intercepts, and describe what they represents?
shot landed
(0,0) (12.5,0) start & end times rocket was in the air

e. Find *h*(8), and describe what it represents? 576, At 8 seconds, rocket was 576 ft. high

f. Estimate the time(s) (in seconds) that the rocket is at a height of 450 feet.
≈ 3 seconds, ≈ 9.5 seconds

g. Find the vertex. Describe what the x coordinate and the y coordinate of the vertex represent.
(6.25, 625) At 6.25 seconds, the rocket reaches a maximum height of 625 ft

Ch 3 Review due tomorrow
Ch 3 Test tomorrow

due Thursday - work 20 min, go over rest of time

Math 2A – Chapter 3 Review **Name** _____ **Hr**___

1. Write the general equation of a quadratic in each of the following forms:
   Standard Form: Vertex Form: Factored Form:

2. Given $y = x^2 + 2x - 3$, find the following:
   a) Factored Form: b) Vertex Form:

Find vertex form if needed then: A) Identify the vertex and axis of symmetry, B) then write a verbal expression for each equation describing the transformation from the parent function.

3. $y = -(x-7)^2 + 3$

_____.

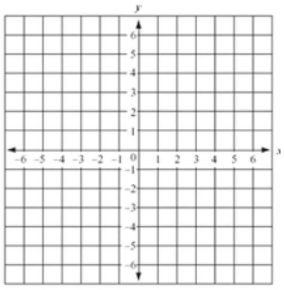
4. $y = x^2 - 5x + 4$.

$\frac{-(-5)}{2(1)} = \frac{5}{2}$ $(2.5, -2.25)$, $x = 2.5$, $y = (x-2.5)^2 - 2.25$

$(2.5)^2 - 5(2.5) + 4$ right 2.5 down 2.25

Graph the functions, and then find the parts (a-d) below:

5. $f(t) = -t^2 - 6t - 5$



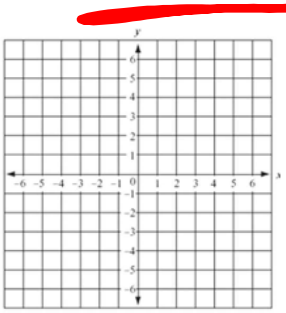
a) Vertex:

b) Axis of Symmetry:

c) x-intercept(s):

d) y-intercept:

6. $f(x) = (x+6)(x+1)$



a) Vertex:

b) Axis of Symmetry:

c) x-intercept(s):

d) y-intercept:

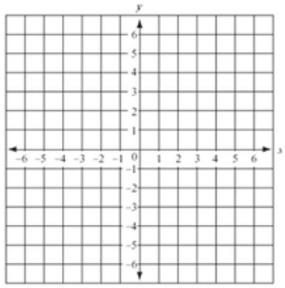
Write the equation of a function that is described below.

7. A quadratic function that is shifted up 5 units, shifted right 2 units and vertically compressed/shrunk by a factor of $\frac{1}{3}$. x^2

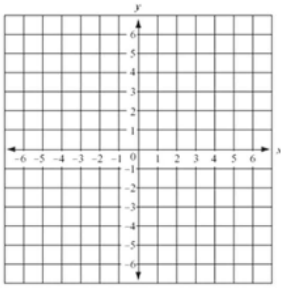
$y = \frac{1}{3}(x-2)^2 + 5$

Graph the functions and describe the transformations.

8. $y = -3(x+3)^2 + 6$

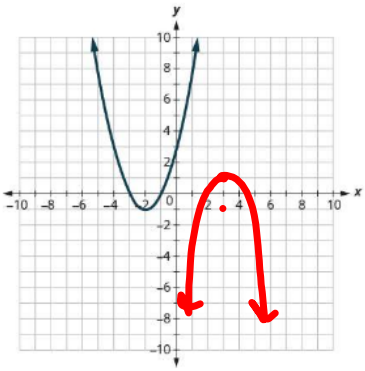


9. $= \frac{1}{4}x^2 - 2$

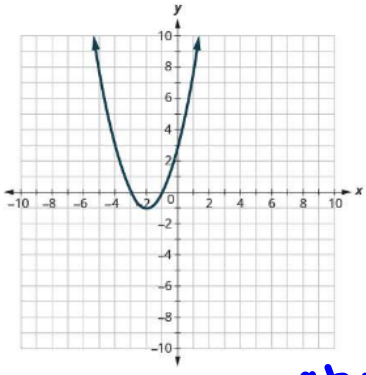


Let $h(x)$ be the function represented by the graph below.

10. Sketch the graph $-h(x-5)$



11. Sketch the graph $h(x)-4$



12. Calculate the **average rate of change** of the function $y = 3x^2 + 6x - 8$ on the interval [-2,0]

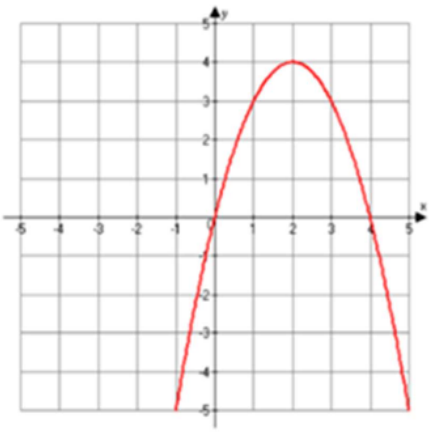
$f(0) = -8$ $(0, -8)$

$f(-2) = 3(-2)^2 + 6(-2) - 8$ $(-2, -8)$

$\frac{f(b)-f(a)}{b-a}$

$\frac{-8-(-8)}{0-(-2)} = \frac{0}{2} = 0$

13. Using the graph below Find the following:



a) State the vertex:

b) What is the axis of symmetry:

c) Is the vertex a max or min and what is the max or min:

d) Find the equation of the quadratic:

c) State the zeros:

d) State the y-intercept:

e) State the Domain:

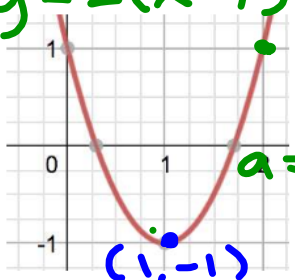
f) State the Range:

g) Find $f(1)$

h) Find the average rate of change on the interval [2, 4]

Write a quadratic equation for the given graphs.

14. $y = 2(x-1)^2 - 1$



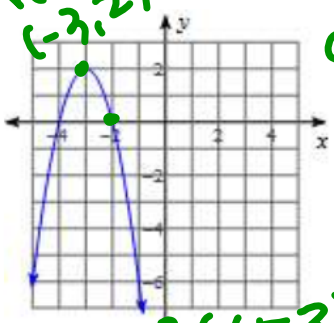
$a = 2$

$(1, -1)$ h, k

15.

h k

$(-3, 2)$



$a = -2$

$y = -2(x+3)^2 + 2$

Write a quadratic function whose graph satisfies the given conditions.

16. x-intercepts: -5 and $\frac{2}{3}$

$x = -5$

$y + 5 = 0$

$(x+5)(3x-2)$

$3x = 2$

$3x - 2 = 0$

$y = 3x^2 + 13x - 10$

17. x-intercepts: 0 and 3

$3x^2 - 2x + 15x - 10$

18. Vertex (-1, 1) and a point (2, 4)

$y = a(x-h)^2 + k$

$4 = 9a + 1$

$\frac{3}{9} = \frac{9a}{9}$

19. Vertex (-3, -1) and a point (-1, -9)

$y = \frac{1}{3}(x+1)^2 + 1$

20. Given $f(x) = ax^2 + bx + c$. State a value for a that makes $f(x)$ open down and wider than: $g(x) = 2x^2 + 5x + 3$.

$a = -1, -\frac{1}{2}, -1.5, -\frac{3}{4}$

$0 \le |a| < 2$

Find a value for c that will make each polynomial a perfect square trinomial.

21. $x^2 + 16x + c$

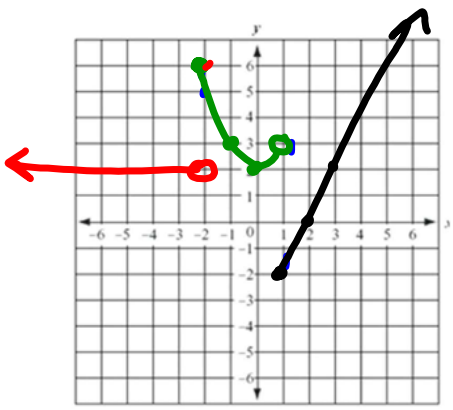
$\left(\frac{16}{2}\right)^2$

22. Graph the function $f(x) = \begin{cases} 2 & if\ x < -2 \\ x^2 + 2 & if\ -2 \le x < 1 \\ 2x - 4 & if\ x \ge 1 \end{cases}$

a) $f(-2) =$ 6

b) $f(0) =$ 2

c) $f(4) =$ 4



23. Write a Piece wise function for the given graph.

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