

# Algebra 1 - Unit 5A REVIEW

Name Key

Period 3

Standard form:  $y = ax^2 + bx + c$

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

axis of sym:  $x = \frac{-b}{2a}$

- 1) For each of the tables below, do the values represent a linear function, a quadratic function or neither? Justify your answer below each table.

x	y
-2	-5
-1	-2
0	-1
1	-2
2	-5

Table function type:

Quadratic

Justification:

Reflection points

x	y
-2	-10
-1	-5
0	-1
1	5
2	3

Table function type:

Neither

Justification:

No pattern

x	y
-2	-5
-1	-3
0	-1
1	1
2	3

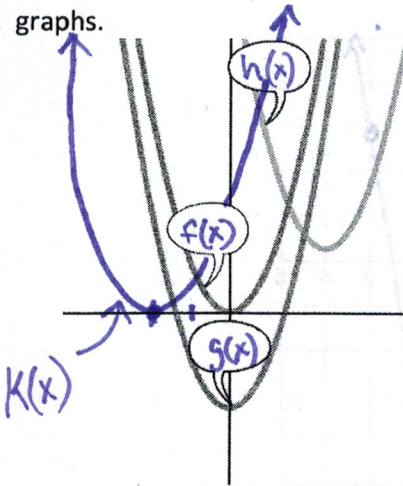
Table function type:

Linear

Justification:

Constant rate of change.

- 2) On the coordinate planes shown below, match the name of the function shown below the graph to the graphs.



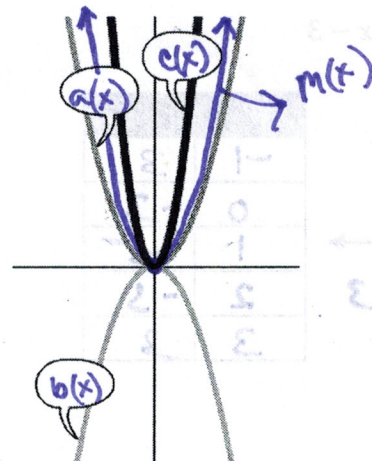
$$f(x) = x^2$$

$$g(x) = x^2 - 2$$

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

Add a sketch of the equation

$k(x) = (x + 2)^2$  to the above graph.



$$a(x) = x^2$$

$$b(x) = -x^2$$

$$c(x) = 4x^2$$

Add a sketch of the equation

$m(x) = 2x^2$  to the above graph.

- 3) Identify the vertex of the each of these parabolas.

a)  $y = (x + 3)^2 + 1$

(-3, 1)

b)  $y = 4x^2 + 8x - 1$

(-1, -5)

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

$x = -1 \quad y = 4(-1)^2 + 8(-1) - 1$

c)  $y = -1(x - 4)^2 - 2$

(4, -2)

- 4) How do you know when a function has a minimum value and when a function has a maximum value?

min is when "a" is positive.

MAX is when "a" is negative.

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5) Which of these functions have a minimum value and which functions have a maximum value?

a)  $y = -1x^2 + 2x - 1$  - MAXIMUM.

b)  $y = 3x^2 - 6x + 9$  MINIMUM

c)  $y = (x - 2)^2 + 4$  - MINIMUM.

d)  $y = -2(x + 3)^2 - 1$  MAXIMUM

Find the vertex, graph and fill in the table (in any order)

6)  $g(x) = -x^2 + 3$

$x = \frac{0}{2(-1)}$

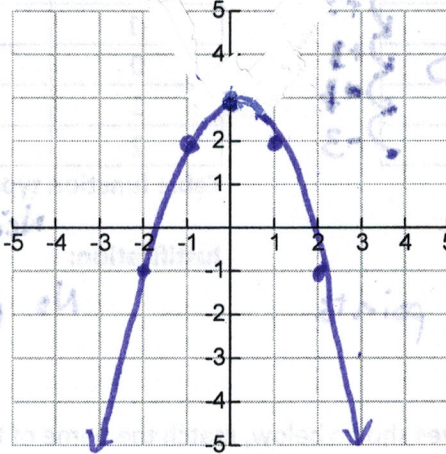
$x = 0$

$y = -(0)^2 + 3$

$y = 3$

VERTEX →

-2	-1
-1	2
0	3
1	2
2	-1



7)  $m(x) = 2x^2 - 4x - 3$

$x = \frac{4}{2(2)}$

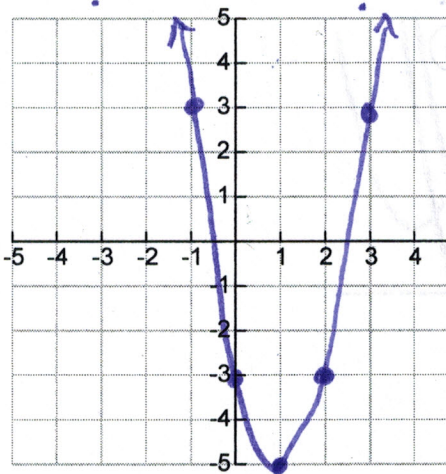
$x = 1$

$y = 2(1)^2 - 4(1) - 3$

$y = -5$

VERTEX →

-1	3
0	-3
1	-5
2	-3
3	3



8) You throw your friends cell phone straight up in the air in the gym with a velocity of 50 feet/second. The situation can be modeled by the equation  $h(t) = -16t^2 + 50t + 4$ , where  $h$  equals height and  $t$  equals time.

a) How long does it take to reach the maximum height?

$x = \frac{-50}{2(-16)} = 1.5625$

1.6 seconds

b) What is the maximum height of the cell phone reaches?

$h(1.5625) = -16(1.5625)^2 + 50(1.5625) + 4$   
 $h(1.5625) = 43.0625 \approx 43$  feet.

c) What is the initial height of the cell phone when you threw it?

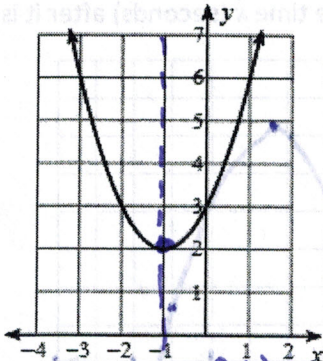
4 feet

d) If the gym ceiling is 40 feet above you, do you hit the ceiling?

yes.

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9) Identify the following features of each graph:



Parent function:  $P(x) = x^2$

$a = +1$   $h = -1$   $k = 2$

axis of symmetry equation:  $x = -1$

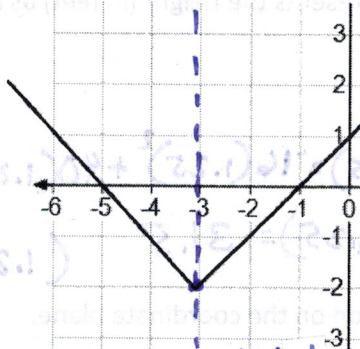
Vertex:  $(-1, 2)$

Horizontal shift: left 1

Vertical shift: up 2

Equation in vertex form:

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



Parent function:  $P(x) = |x|$

$a = +1$   $h = -3$   $k = -2$

axis of symmetry equation:  $x = -3$

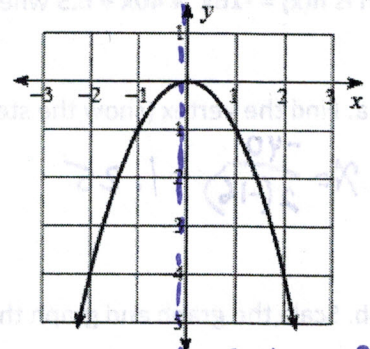
Vertex:  $(-3, -2)$

Horizontal shift: left 3

Vertical shift: down 2

Equation in vertex form:

$f(x) = |x+3| - 2$



Parent function:  $P(x) = x^2$

$a = -1$   $h = 0$   $k = 0$

axis of symmetry equation:  $x = 0$

Vertex:  $(0, 0)$

Horizontal shift: -

Vertical shift: -

Equation in vertex form:

$f(x) = -x^2$

10) Use the equation to fill in the missing information. Then graph BOTH the parent and child functions.

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

Parent function:

$P(x) = x^2$

axis of symmetry equation:  $x = 3$

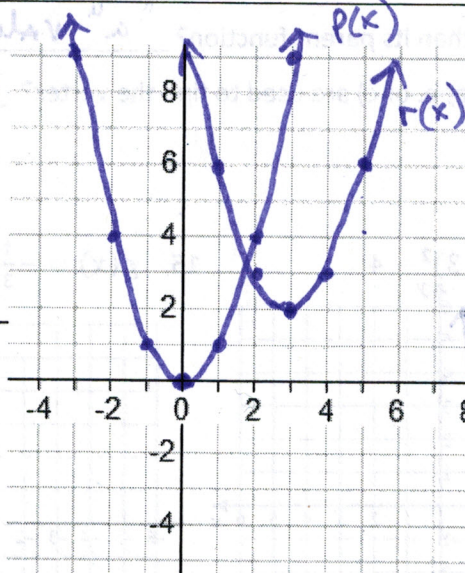
Vertex:  $(3, 2)$

Horizontal shift:

Right 3

Vertical shift:

up 2



$r(x) = 2|x+4| - 5$

Parent function:

$P(x) = |x|$

axis of symmetry equation:  $x = -4$

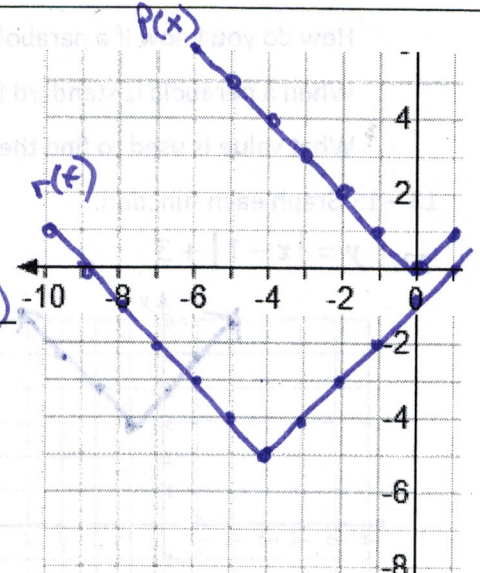
Vertex:  $(-4, -5)$

Horizontal shift:

left 4

Vertical shift:

down 5



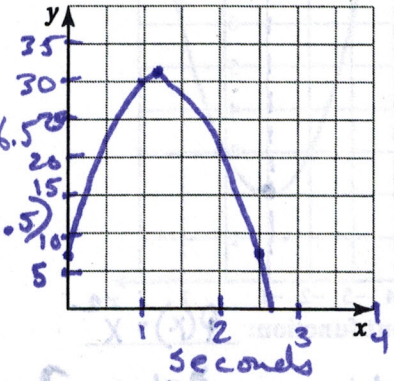
# Algebra 1 - Unit 5A REVIEW

11) An athlete throws a shot put with an initial vertical velocity of 40 feet per second. The equation that represents the situation is  $h(x) = -16x^2 + 40x + 6.5$  where  $y$  represents the height (in feet) as a function of the time  $x$  (seconds) after it is thrown.

a. Find the vertex (show the steps)

$$x = \frac{-40}{2(-16)} = 1.25 \quad h(1.25) = -16(1.25)^2 + 40(1.25) + 6.5$$

$$h(1.25) = 31.5 \quad (1.25, 31.5)$$



b. Scale the graph and graph the function on the coordinate plane.

c. Answer these questions based on the above equation and its graph.

What is the maximum height of the shot put? <b>31.5 ft</b>	When will the shot put reach its maximum height? <b>1.25 seconds</b>	What is the initial height of the shot put? <b>6.5 feet</b>
What is the total horizontal distance that the shot put is thrown? <b>OMIT</b>	Is $h(t)$ increasing or decreasing from 1.5 to 2.5 seconds? <b>decreasing</b>	True or False: $h(1) > h(2)$ <input checked="" type="radio"/> T <input type="radio"/> F $h(0.5) < h(1.5)$ <input checked="" type="radio"/> T <input type="radio"/> F $h(1.2) < h(0)$ <input type="radio"/> T <input checked="" type="radio"/> F

12) Fill in the blanks to answer each question.

How do you know if a parabola opens up or down? The sign of the "a" value

How do you know if a parabola shifts left or right from an equation in vertex form? "h" value

How do you know if a parabola shifts up or down from an equation in vertex form? "k" value

How do you know if a parabola is wider (shrink) than its parent function? "a" value  $0 < a < 1$

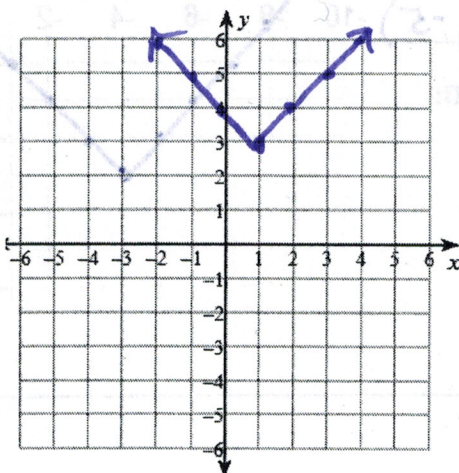
How do you know if a parabola is narrower (stretch) than its parent function? "a" value  $a > 1$

When a parabola is standard form, what two values (a, b, or c) are used to find the vertex? a and b  $x = \frac{-b}{2a}$

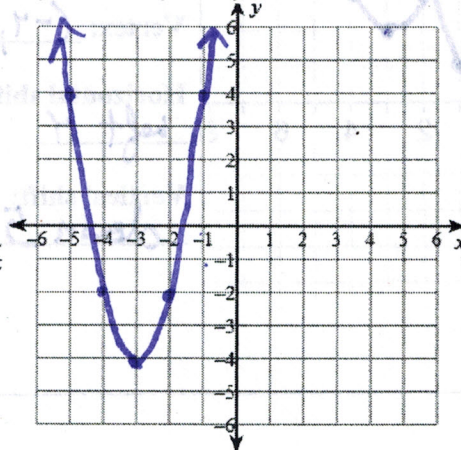
What value is used to find the y-intercept? "c"

13 - 15 Graph each function.

13.  $y = |x - 1| + 3$



14.  $f(x) = 2(x + 3)^2 - 4$



15.  $g(x) = -\frac{1}{3}|x - 2| + 1$

