

Name _____

Date _____

CHAPTER
9

Quiz 9.1 to 9.3 Review

1. How would the graph of the function $y = x^2 + 2$ be affected if the function were changed to $y = x^2 - 4$?

moving down
6 units



$y = ax^2 + bx + c$ $x = \frac{-b}{2a}$
 $y = a(x-h)^2 + k$ (h, k)
 2. How would the graph of the function $y = x^2 + 6$ be affected if the function were changed to $y = x^2 + 9$?

moving up 3.



3. Find the vertex & axis of symmetry of the functions:

a) $y = -4x^2 + 16x - 1$

$a = -4$

b) $g(x) = 4x^2 + 16x - 3$

$b = 16$

$c = -1$

$x = \frac{-b}{2a} = \frac{-16}{-8} = 2$

$a = 4$ $x = \frac{-16}{8} = -2$ $x = -2$

$b = 16$

$c = -3$

$x = 2$ axis

$(2, 15)$

$y = -4(2)^2 + 16(2) - 1$
 $y = -16 + 32 - 1 = 15$

$g(-2) = 4(-2)^2 + 16(-2) - 3$
 $= 16 - 32 - 3 = -19$

$(-2, -19)$

4. What is the vertex & axis of symmetry of the functions:

a) $f(x) = (x-7)^2 - 8$

b) $m(x) = -3(x+2)^2 + 7$

$V = (7, -8)$
 $x = 7$

$V = (-2, 7)$
 $x = -2$

5. Convert both equations in #4 to standard form.

a) $f(x) = (x-7)^2 - 8$

-7×2
 $x^2 - 14x + 49 - 8$

$f(x) = x^2 - 14x + 41$

$(x-7)(x-7) - 8$

$x^2 - 7x - 7x + 49 - 8$

$f(x) = x^2 - 14x + 41$

b) $m(x) = -3(x+2)^2 + 7$

2×2
 $-3(x^2 + 4x + 4) + 7$
 $-3x^2 - 12x - 12 + 7$

$m(x) = -3x^2 - 12x - 5$

$m(x) = -3(x+2)(x+2) + 7$

$-3(x^2 + 2x + 2x + 4) + 7$

$-3(x^2 + 4x + 4) + 7$

$-3x^2 - 12x - 12 + 7$

$-3x^2 - 12x - 5$

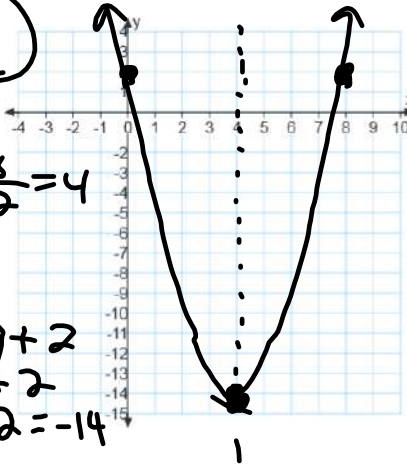
For the given equations, graph the function using a table of at least three values, then answer the accompanying questions.

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

x	y
4	-14
0	2
8	2

$$x = \frac{-b}{2a} = \frac{8}{2} = 4$$

$$\begin{aligned} 4^2 - 8(4) + 2 \\ 16 - 32 + 2 \\ -16 + 2 = -14 \end{aligned}$$



Opens: UP

Axis of Symmetry: $x = 4$

Vertex: $(4, -14)$

Y-intercept: $(0, 2)$

Min or Max: -14

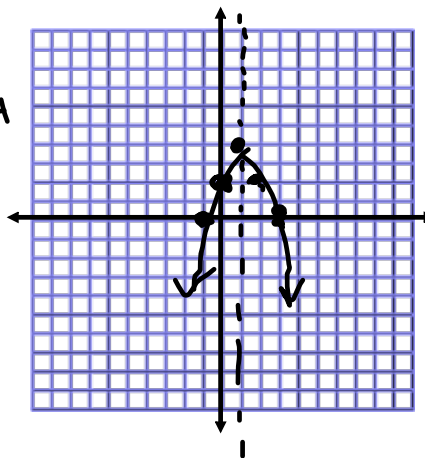
Domain: $\mathbb{R}$

Range: $y \geq -14$

7. $y = -2(x-1)^2 + 4$

x	y
2	2
1	4
0	2

$$\begin{aligned} -2(3-1)^2 + 4 \\ -4 + 4 = 0 \end{aligned}$$



Opens: down

Axis of Symmetry: $x = 1$

Vertex: $(1, 4)$

Min or Max: 4

Y-intercept: $(0, 2)$

Domain: $\mathbb{R}$

Range: $y \leq 4$

For 8 & 9, complete the square to convert from vertex to standard form.

8. $y = x^2 - 8x + 19$

$$\begin{aligned} y &= x^2 - 8x + \frac{16}{2} + 19 - \frac{16}{2} \\ &= (x-4)^2 + 3 \end{aligned}$$

7. $y = (x-4)^2 + 3$

vertex: $(4, 3)$

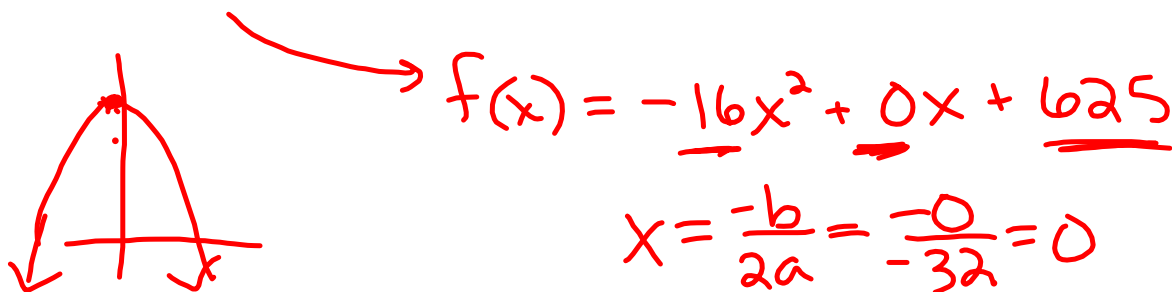
9. $f(x) = 5x^2 + 10x + 7$

$$\begin{aligned} f(x) &= 5x^2 + 10x + \underline{5} + 7 - \underline{5} \\ &= 5(x^2 + 2x + \underline{1}) \\ &= 5(x+1)^2 + 2 \end{aligned}$$

8. $f(x) = 5(x+1)^2 + 2$

vertex: $(-1, 2)$

A bird drops a stick from the top of a tower. The height after x seconds is given by $f(x) = 625 - 16x^2$. Graph it! Scroll and/or zoom to explore the parabola.



What is the maximum height of the bird's stick on the previous slide?

Vertex

(0, 625)

time max

$$f(0) = 625 - 16(0)^2 = 625$$

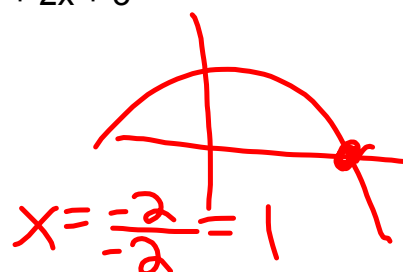
625 ft

A grasshopper jumps off a tree stump. The height, in feet, of the grasshopper above the ground after x seconds is modeled by, $h(x) = -x^2 + 2x + 3$

$$a = -1$$

$$b = 2$$

$$c = 3$$



After how many seconds will the grasshopper land on the ground (use the previous slide)?

$$\begin{aligned} &-(1)^2 + 2(1) + 3 \\ &-1 + 2 + 3 \\ &4 \end{aligned}$$

max height

$$(1, 4) \rightarrow (1, 4 \text{ ft})$$