

Quadratic Functions

Name: _____

Answer Key

1. The following equations are in Standard Form. Please complete the chart.

Function Remember: $y = a(x-h)^2 + k$	a	h think opposite	k	Vertex (h,k)	Axis of symmetry $X=h$	Range - opens? - k value	Standard form $y = ax^2 + bx + c$	y-intercept let $x=0$	Max/Min y-value (k)
$y = \frac{3}{4}(x-2)^2 + 6$	$\frac{3}{4} \uparrow$	2	6	(2,6)	$X=2$	$y \geq 6$	$y = \frac{3}{4}x^2 - 3x + 9$	(0,9)	Min 6
$y = -(x-5)^2 - 3$	-1 \downarrow	5	-3	(5,-3)	$X=5$	$y \leq -3$	$y = -x^2 + 10x - 28$	(0,-28)	Max -3
$y = 9(x-\frac{1}{2})^2 + 10$	9 \uparrow	$\frac{1}{2}$	10	($\frac{1}{2}$, 10)	$X = \frac{1}{2}$	$y \geq 10$	$y = 9x^2 - 9x + 10.25$	(0,10.25)	Min 10
$y = -2(x+3)^2 + 4$	-2 \downarrow	-3	4	(-3,4)	$X = -3$	$y \leq 4$	$y = -2x^2 - 12x - 14$	(0,-14)	Max 4
$y = 5(x-1)^2$	5 \uparrow	1	0	(1,0)	$X=1$	$y \geq 0$	$y = 5x^2 - 10x + 5$	(0,5)	Min 0
$y = 4x^2 + 6$	4 \uparrow	0	6	(0,6)	$X=0$	$y \geq 6$	$y = 4x^2 + 6$	(0,6)	Min 6
$y = (x-3)^2 - 17$	1 \uparrow	3	-17	(3,-17)	$X=3$	$y \geq -17$	$y = x^2 - 6x - 8$	(0,-8)	Min -17
$y = x^2 - 5$	1 \uparrow	0	-5	(0,-5)	$X=0$	$y \geq -5$	$y = x^2 - 5$	(0,-5)	Min -5
$y = \frac{3}{4}(x+2)^2 + 1$	$\frac{3}{4} \uparrow$	-2	1	(-2,1)	$X = -2$	$y \geq 1$	$y = \frac{3}{4}x^2 + 3x + 4$	(0,4)	Min 1
$y = -4.9(x-1.5)^2 + 40.2$	-4.9 \downarrow	1.5	40.2	(1.5, 40.2)	$X = 1.5$	$y \leq 40.2$	$y = -4.9x^2 + 14.7x + 29.175$	(0,29.175)	Max 40.2
$y = x^2$	1 \uparrow	0	0	(0,0)	$X=0$	$y \geq 0$	$y = x^2$	(0,0)	Min 0
$y = (x-2)^2$	1 \uparrow	2	0	(2,0)	$X=2$	$y \geq 0$	$y = x^2 - 4x + 4$	(0,4)	Min 0
$y = -3(x+5)^2 - 4$	-3 \downarrow	-5	-4	(-5,-4)	$X = -5$	$y \leq -4$	$y = -3x^2 - 30x - 79$	(0,-79)	Max -4
$y = \frac{1}{2}(x-8)^2 + 7$	$\frac{1}{2} \uparrow$	8	7	(8,7)	$X=8$	$y \geq 7$	$y = \frac{1}{2}x^2 - 8x + 39$	(0,39)	Min 7

$y = -4.9(x-1.5)^2 + 40.2$

$a = -4.9$ (open down $\hat{=}$ SF = 4.9 \rightarrow narrower)

$h = 1.5$ (right 1.5)

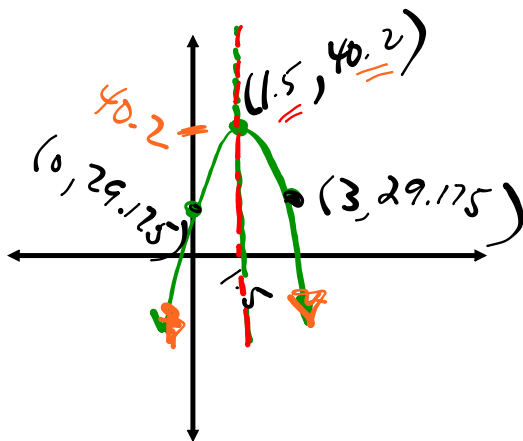
$k = 40.2$ (up 40.2)

Vertex (1.5, 40.2)

y.int $\rightarrow y = -4.9(0-1.5)^2 + 40.2$

$y = 29.175$

(0, 29.175)



A.O.S $\Rightarrow x = 1.5$

D: $\{x \in \mathbb{R}\}$

R: $\{y \leq 40.2\}$

Max y value is 40.2

Forms of the Quadratic Function

Vertex Form

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

- stretch factor: "a"
- vertex: (h, k)

Properties

- max/min y value
- axis of symmetry
- domain/range

Standard Form

$$y = ax^2 + bx + c$$

- stretch factor: "a"
- y intercept: (0, c)

Example 1: Change from vertex to standard form.

Vertex Form

$$y = -3(x - 2)^2 + 5$$

$$y = -3(x^2 - 4x + 4) + 5$$

$$y = -3x^2 + 12x - 12 + 5$$

Expand

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

Standard

y-int

$$y = -3(0)^2 + 12(0) + 7$$

(0, 7)

(x-2)(x-2)

$$x^2 - 2x - 2x + 4$$

$$x^2 - 4x + 4$$

- ① (st)²
- ② 1st x 2nd x 2
- ③ (2nd)²

3 Step Rule

Homework \rightarrow Standard form
from yesterday's sheet

$$\begin{aligned} \text{a)} \quad y &= \frac{3}{4}(x-2)^2 + 6 \\ y &= \frac{3}{4}(x^2 - 4x + 4) + 6 \\ y &= \frac{3}{4}x^2 - 3x + 3 + 6 \\ y &= \frac{3}{4}x^2 - 3x + \underline{9} \text{ yiat} \end{aligned}$$