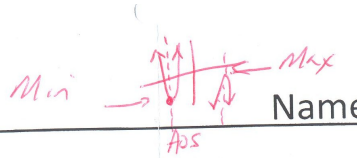


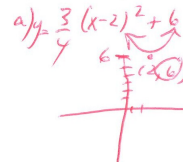
Quadratic Functions

Min →  Answer Key

Name: _____

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

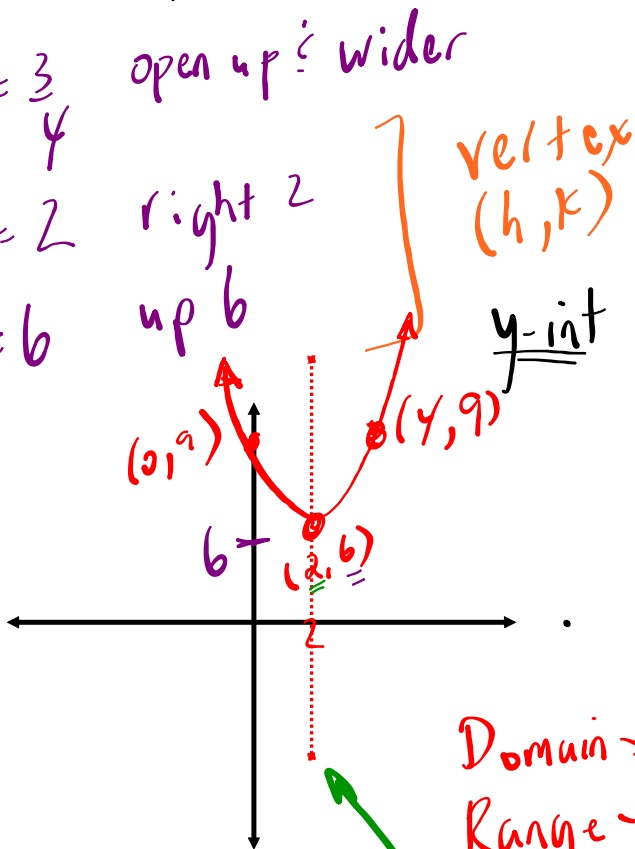
Function Remember: $y = a(x-h)^2 + k$	a	h think opposite	k	Vertex (h,k)	Axis of symmetry $X=h$	Range - opens? - k value	Standard form $y = ax^2 + bx + c$	y-intercept	Max/Min y-value (k)
$y = \frac{3}{4}(x-2)^2 + 6$	$\frac{3}{4}$ ↑	2	6	(2,6)	$X=2$	$y \geq 6$	$y = \frac{3}{4}x^2 - 3x + 9$	(0,9)	Min 6
$y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



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

$$y = \frac{3}{4}(x-2)^2 + 6$$

$a = \frac{3}{4}$ open up: wider
 $h = 2$ right 2
 $k = 6$ up 6



$\rightarrow (2, 6)$

$$y = \frac{3}{4}(0-2)^2 + 6$$

$$y = \frac{3}{4}(4) + 6$$

$$y = 9$$

 $(0, 9)$

Domain $\rightarrow \{x \in \mathbb{R}\}$

Range $\rightarrow \{y \geq 6\}$

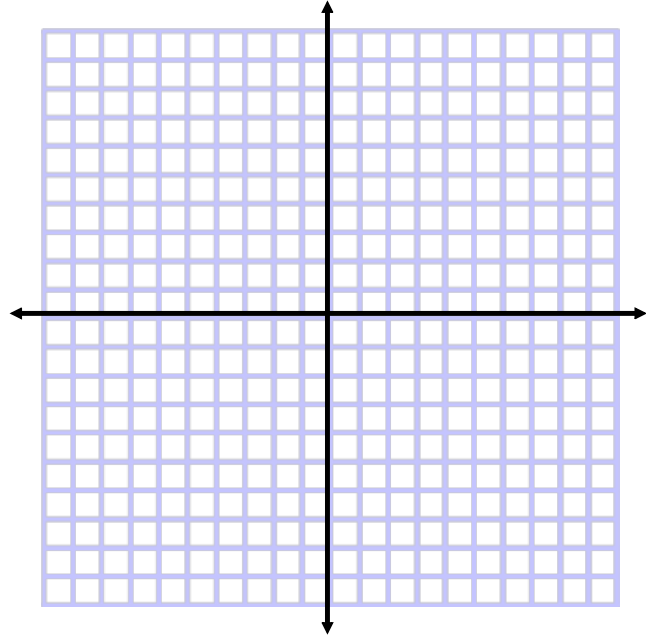
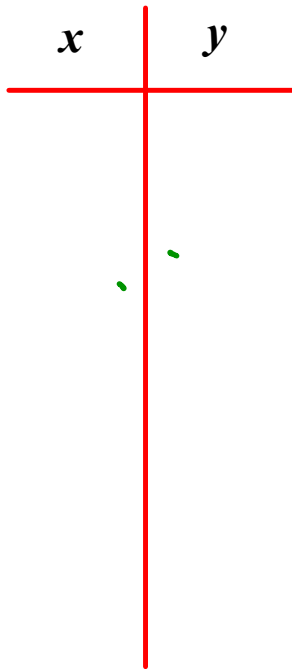
A.O.S $x = 2$

Min y value of 6

Sketches/Graphs of a Quadratic

OPTION #1 - Table of values (vertex & 3 points left/right)

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



OPTION #2 - Axis of Symmetry (vertex, y-intercept & its reflection)

ex: $y = -(x + 5)^2 + 1$

a stretch factor is always positive

$a = -1$ (open down & same)

$h = -5$ (left 5)

$k = 1$ (up 1)

Vertex $(-5, 1)$

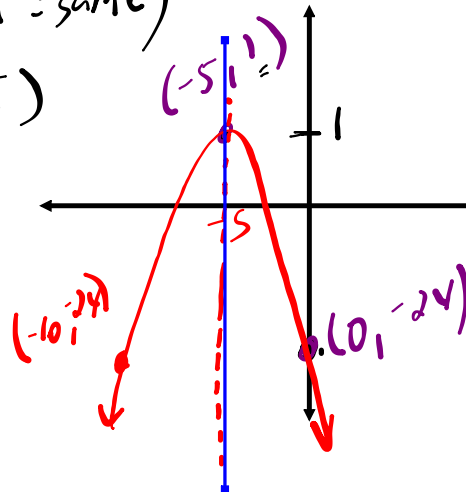
y-int

$$y = -(0 + 5)^2 + 1$$

$$y = -(25) + 1$$

$$y = -24$$

$$(0, -24)$$



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

R: $\{y \leq 1\}$

Max y value is 1

A.O.S $x = -5$

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

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

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

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

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

a = -3

y int (0, -7)

Expand

Standard

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

① (st)²
 ② (1st x 2nd) x 2
 ③ (2nd)²
 3 Step Rule

One more

$$\begin{aligned}d) \quad y &= -2(x+3)^2 + 4 \\ y &= -2(x^2 + 6x + 9) + 4 \\ y &= -2x^2 - 12x - 18 + 4 \\ y &= -2x^2 - 12x - 14\end{aligned}$$

vertex
(0, -14)

HOMEWORK → Yesterday's
Sheet
+ Standard
form