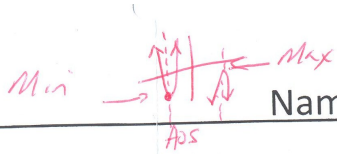


Quadratic Functions



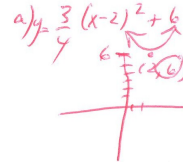
Answer Key

Name: _____

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

* Algebra let x=0

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



HW questions

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

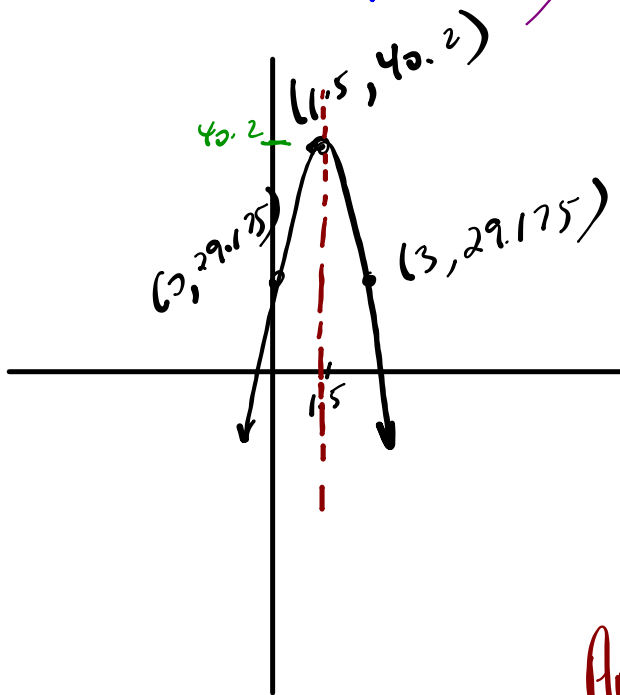
$$y = -4.9(x-1.5)^2 + 40.2$$

$a = -4.9$ ← opens down ; s.f = 4.9 (narrower)
 $h = 1.5$ ← Right 1.5
 $k = 40.2$ ← up 40.2

Vertex (1.5, 40.2)

$y_{int} \Rightarrow$ let $x = 0$
 $y = -4.9(0-1.5)^2 + 40.2$

$y_{int} = 29.175$
 (0, 29.175)



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

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

Max y value of 40.2

AoS $x = 1.5$

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 $a = -3$
 vertex (2, 5)

Vertex Form → $y = -3(x - 2)^2 + 5$

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

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

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

$a = -3$
 y-int
 (0, -7)

Standard

Vertex
(-7, -3)

$$y = 5(x+7)^2 - 3$$

$$y = 5(x^2 + 14x + 49) - 3$$

$$y = 5x^2 + 70x + 245 - 3$$

$$y = 5x^2 + 70x + 242$$

y int
(0, 242)

Standard Form

Review \rightarrow Squaring a binomial

$$(x-5)^2$$

$$(x-5)(x-5)$$

$$x^2 - 5x - 5x + 25$$

$$x^2 - 10x + 25$$

OR

3 Step Rule

- ① $(1^{st})^2$
- ② $1^{st} \times 2^{nd} \times 2$
- ③ $(2^{nd})^2$

$$x^2 - 10x + 25$$

EXAMPLE 2: Determine ALL properties for the given quadratic...

Vertex Form	$y = \frac{2}{3}(x + 3)^2 - 1$
Direction of Opening	UP
Stretch Factor	$\frac{2}{3}$ (wider)
Vertex	$(-3, -1)$ ✓
y - intercept	$(0, 5)$ ✓
Domain	$\{x \in \mathbb{R}\}$
Range	$\{y \geq -1\}$
Max or Min y - value	Min y value is -1
Axis of Symmetry	$x = -3$
Standard Form	$y = \frac{2}{3}x^2 + 4x + 5$
Sketch (label ALL key Points)	

X
y-int
 $\frac{2}{3}(0+3)^2 - 1$
 $\frac{2}{3}(9) - 1$
 $6 - 1$
 5
 (V) $y = \frac{2}{3}(x+3)^2 - 1$
 $y = \frac{2}{3}(x^2 + 6x + 9) - 1$
 $y = \frac{2}{3}x^2 + 4x + 6 - 1$
 $y = \frac{2}{3}x^2 + 4x + 5$
 (S) $y = \frac{2}{3}x^2 + 4x + 5$

HW: p. 335 - #4, 5, 7, 10

 Worksheet - Properties of Quadratics.docx

↳ Standard Form

Attachments

Worksheet - Properties of Quadratics.docx