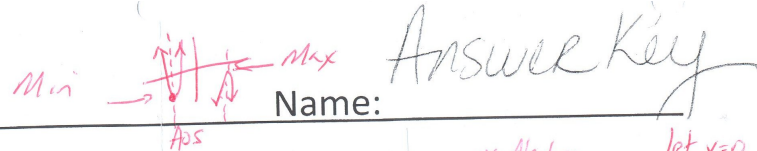


Quadratic Functions

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 let $x=0$	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)	$X=3$	$y \leq -17$	$y = x^2 - 6x - 8$	(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

y-int

$y = 4x^2 + 6$

$y = 4(0)^2 + 6$

$y = 6$  (0,6)

$a = 4$  ✓  
open up  
narrow ✓

$h = 0$   
 $k = 6$  } → vertex (0,6) ✓

Same

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

$R: \{y \geq 6\}$

Min y value of 6

$a < 0 \rightarrow x = 0$

## 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.**

- opens down
- sf = 3 (narrow)
- ✓ vertex (2, 5)
- ✓ y-int (0, -7)

$$(x-2)(x-2)$$

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

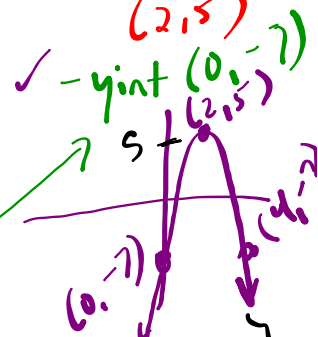
Vertex Form

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

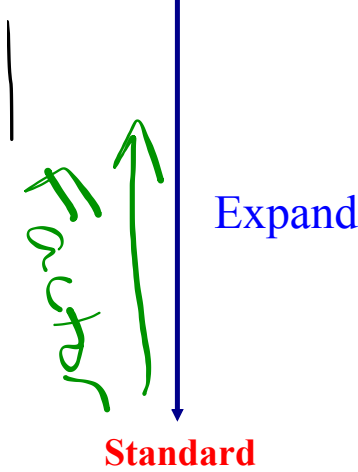
$$y = -3(x^2 - 4x + 4) + 5$$

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

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



D:  $\{x \in \mathbb{R}\}$   
 R:  $\{y \leq 5\}$   
 A.O.S  $\rightarrow x = 2$   
 Max value of 5



**EXAMPLE 1: Determine ALL properties for the given quadratic...**

Vertex Form	$y = -2(x - 1)^2 + 3$
Direction of Opening	Down
Stretch Factor	2 (narrower)
Vertex	(1, 3)
y - intercept	(0, 1)
Domain	$\{x \in \mathbb{R}\}$
Range	$\{y \leq 3\}$
Max or Min y - value	Max y-value is 3
Axis of Symmetry	$x = 1$
Sketch (label ALL key Points)	


$y = -2(x) + 3$   
 $y = 1$

**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 -1
Axis of Symmetry	$x = -3$
Sketch (label ALL key Points)	

$y = \frac{2}{3}(9) - 1$   
 $y = 6 - 1$   
 $y = 5$

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

 Worksheet - Properties of a Quadratic.docx

\* Last night  
↳ Standard form

## Attachments

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Assignment - Properties of a Quadratic.docx