

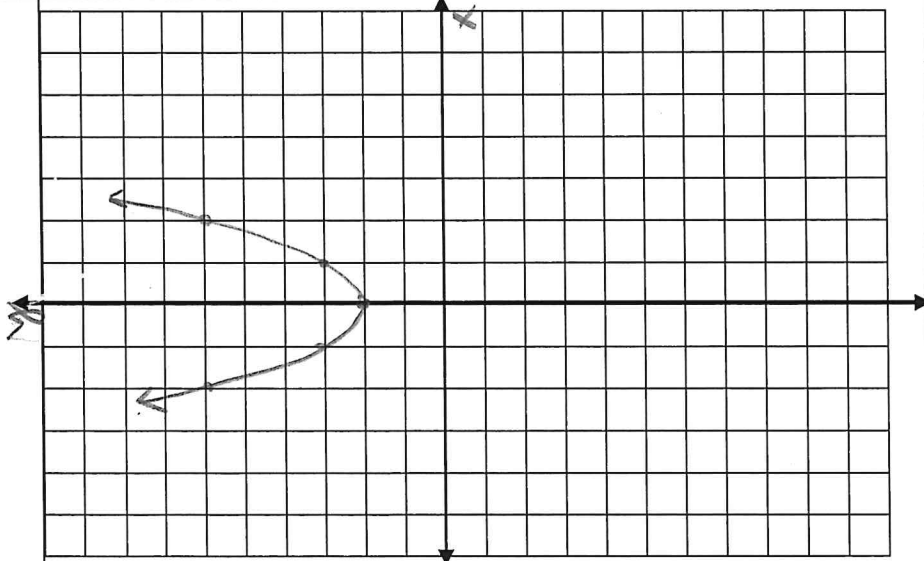
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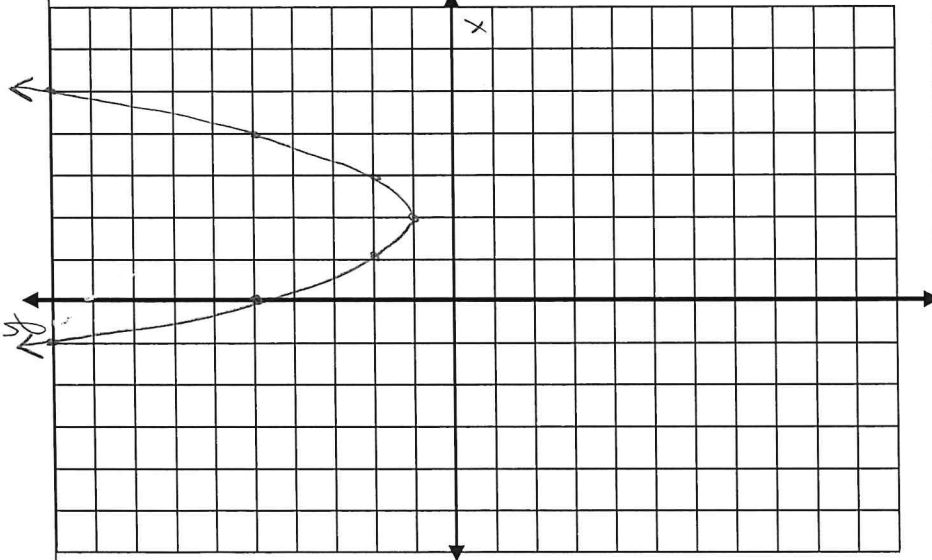
Translations of Quadratic Function – Assignment

<p>1.</p>		<p>Equation: $y = x^2 - 4$</p> <p>Equation of the axis of symmetry</p> <p>Direction of opening</p> <p>The maximum or minimum value</p> <p>The exact x-intercept(s) if they exist</p> <p>The exact y-intercept</p> <p>Domain</p> <p>Range</p> <p>Describe transformations of $y = x^2$ that generated the quadratic function above.</p>	<p>Rewritten equation: $y = -(x-0)^2 - 4$</p> <p>$x = 0$</p> <p>up</p> <p>min. at $y = -4$</p> <p>$(-2, 0), (2, 0)$</p> <p>$(0, -4)$</p> <p>D: $\{x \mid x \in \mathbb{R}\}$</p> <p>R: $\{y \mid y \leq -4, y \in \mathbb{R}\}$</p> <p>• VT down by 4 units</p>
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2.



Equation: $y = x^2 + 2$	Rewritten equation: $y = 1(x-0)^2 + 2$
Equation of the axis of symmetry	$x = 0$
Direction of opening	up
The maximum or minimum value	min. at $y = 2$
The exact x-intercept(s) if they exist	none
The exact y-intercept	$(0, 2)$
Domain	$D: \{x \mid x \in \mathbb{R}\}$
Range	$R: \{y \mid y \geq 2, y \in \mathbb{R}\}$
Describe transformations of $y = x^2$ that generated the quadratic function above.	• VT up by 2 units.

<p>3.</p> 	<p>Equation: $y = (x-2)^2 + 1$</p> <p>Equation of the axis of symmetry</p> <p>Direction of opening</p> <p>The maximum or minimum value</p> <p>The exact x-intercept(s) if they exist</p> <p>The exact y-intercept</p> <p>Domain</p> <p>Range</p> <p>Describe transformations of $y = x^2$ that generated the quadratic function above.</p>	<p>Rewritten equation:</p> <p>$y = +1(x-2)^2 + 1$</p> <p>$x = 2$</p> <p>up</p> <p>min. at $y = 1$</p> <p>none</p> <p>$(0, 5)$</p> <p>$D: \{x x \in \mathbb{R}\}$</p> <p>$R: \{y y \geq 1, y \in \mathbb{R}\}$</p> <ul style="list-style-type: none"> • HT right by 2 units • VT up by 1 unit
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4.		<p>Equation: $y = (x+1)^2 - 2$</p> <p>Equation of the axis of symmetry</p> <p>Direction of opening</p> <p>The maximum or minimum value</p> <p>The exact x-intercept(s) if they exist *</p> <p>The exact y-intercept</p> <p>Domain</p> <p>Range</p> <p>Describe transformations of $y = x^2$ that generated the quadratic function above.</p>	<p>Rewritten equation:</p> <p>$y = +1(x+1)^2 - 2$</p> <p>$x = -1$</p> <p>up</p> <p>min. at $y = -2$</p> <p>$(-\sqrt{2}-1, 0), (-\sqrt{2}-1, 0)$</p> <p>$(0, -1)$</p> <p>D: $\{x \mid x \in \mathbb{R}\}$</p> <p>R: $\{y \mid y \geq -2, y \in \mathbb{R}\}$</p> <ul style="list-style-type: none"> • HT left by 1 unit • VT down by 2 units
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$$x = \sqrt{2}-1$$

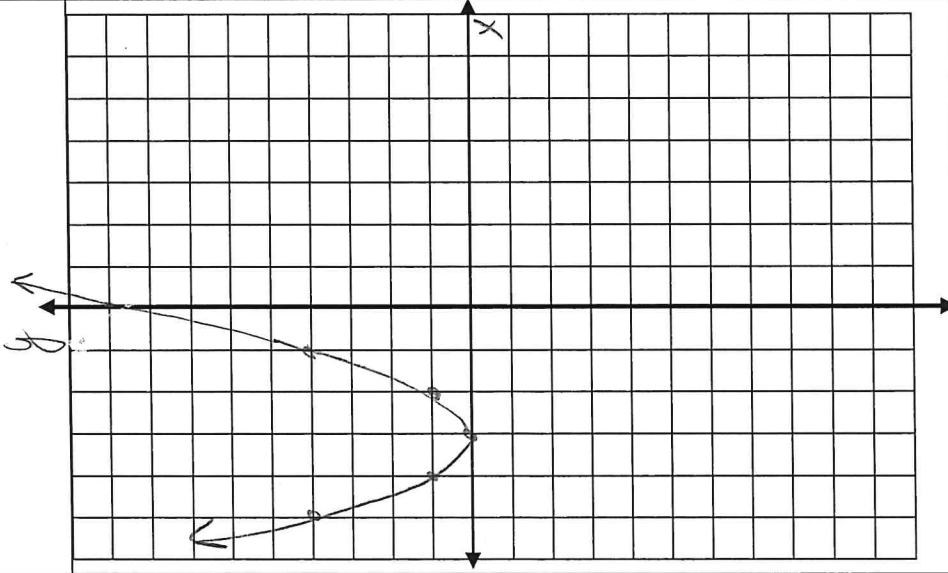
$$x = -\sqrt{2}-1$$

* $y = (x+1)^2 - 2$

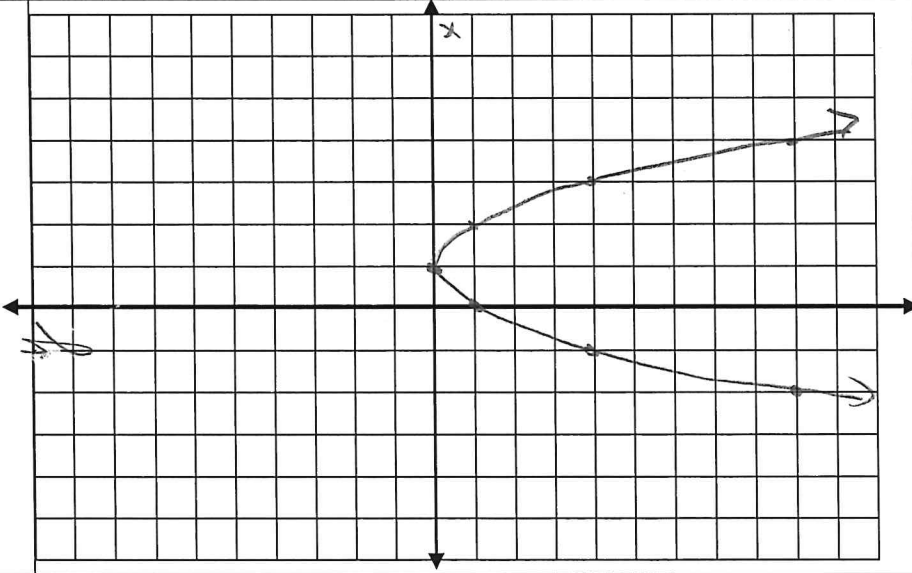
$$0 = (x+1)^2 - 2$$

$$\sqrt{2} = \sqrt{(x+1)^2}$$

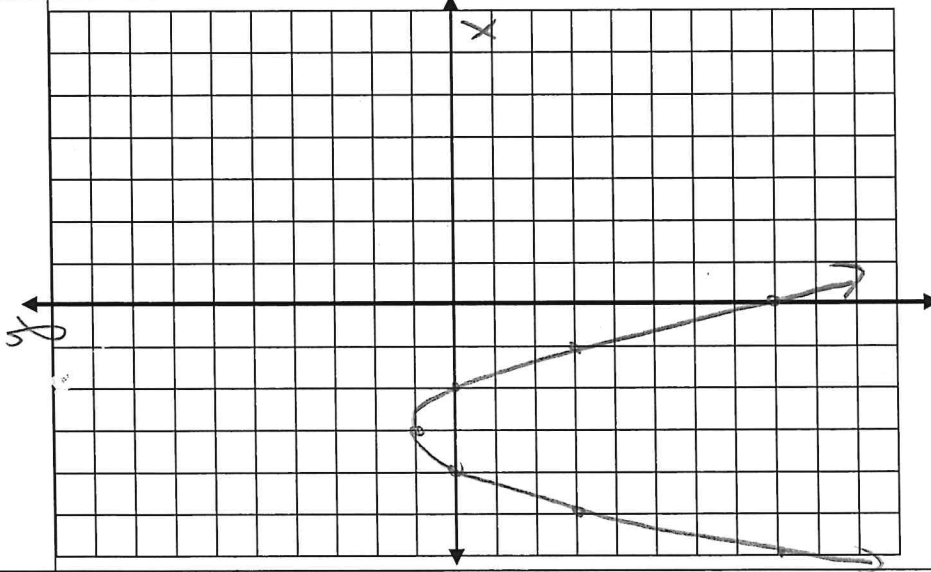
$$\pm\sqrt{2} = x+1$$

<p>5.</p> 	<p>Equation: $y = (x+3)^2$</p> <p>Equation of the axis of symmetry</p> <p>Direction of opening</p> <p>The maximum or minimum value</p> <p>The exact x-intercept(s) if they exist</p> <p>The exact y-intercept</p> <p>Domain</p> <p>Range</p> <p>Describe transformations of $y = x^2$ that generated the quadratic function above.</p>	<p>Rewritten equation:</p> <p>$y = +1(x+3)^2 + 0$</p> <p>$x = -3$</p> <p>up</p> <p>min. at $y = 0$</p> <p>$(-3, 0)$</p> <p>$(0, 9)$</p> <p>D: $\{x \in \mathbb{R}\}$</p> <p>R: $\{y \mid y \geq 0, y \in \mathbb{R}\}$</p> <p>HT left by 3 units</p>
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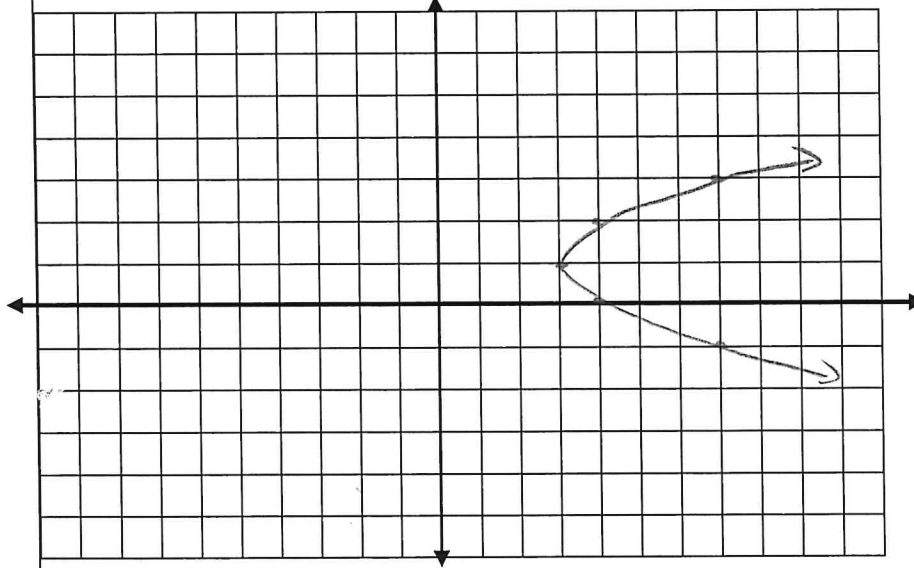
* $y = (x+3)^2$
 $y = (0+3)^2$
 $y = 3^2$
 $y = 9$ ✓

<p>6.</p> 	<p>Equation: $y = -(x-1)^2$</p> <p>Equation of the axis of symmetry</p> <p>Direction of opening</p> <p>The maximum or minimum value</p> <p>The exact x-intercept(s) if they exist</p> <p>The exact y-intercept</p> <p>Domain</p> <p>Range</p> <p>Describe transformations of $y = x^2$ that generated the quadratic function above.</p>	<p>Rewritten equation: $y = -(x-1)^2 + 0$</p> <p>$x = +1$</p> <p>down</p> <p>max. at $y=0$</p> <p>$(1,0)$</p> <p>$(0,-1)$</p> <p>D: $\{x x \in \mathbb{R}\}$</p> <p>R: $\{y y \leq 0, y \in \mathbb{R}\}$</p> <ul style="list-style-type: none"> • HT right by 1 unit • R in x-axis
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7.	<p>Equation:</p> $y = -(x+3)^2 + 1$	<p>Rewritten equation:</p> $y = -1(x+3)^2 + 1$
<p>Equation of the axis of symmetry</p>		$x = -3$
<p>Direction of opening</p>		<p>down</p>
<p>The maximum or minimum value</p>		<p>max at $y = 1$</p>
<p>The exact x-intercept(s) if they exist</p>		<p>$(-4, 0), (-2, 0)$</p>
<p>The exact y-intercept</p>		<p>$(0, -8)$</p>
<p>Domain</p>		<p>$D: \{x \mid x \in \mathbb{R}\}$</p>
<p>Range</p>		<p>$R: \{y \mid y \leq 1, y \in \mathbb{R}\}$</p>
<p>Describe transformations of $y = x^2$ that generated the quadratic function above.</p>		<ul style="list-style-type: none"> ◦ R in the x-axis ◦ HT left by 3 units ◦ VT up by 1 unit



8.



Equation: $y = -(x-1)^2 - 3$	Rewritten equation: $y = -1(x-1)^2 - 3$
Equation of the axis of symmetry	$x = 1$
Direction of opening	down
The maximum or minimum value	max. at $y = -3$
The exact x-intercept(s) if they exist	none
The exact y-intercept	$(0, -4)$
Domain	$D: \{x \mid x \in \mathbb{R}\}$
Range	$R: \{y \mid y \leq -3, y \in \mathbb{R}\}$
Describe transformations of $y = x^2$ that generated the quadratic function above.	<ul style="list-style-type: none"> • R in the x-axis • HT Right by 1 unit • VT down by 3 units

9. Circle all quadratic functions. If a given relations is not a quadratic function, determine what type of relations it is (linear, radical, rational, undefined in the universe of real numbers), polynomial but not quadratic,

$x^2 + x - 2 = y$	$y = -\sqrt{5} + x - x^2$	$y = -x^4 + x^2 + x - 1$	$y = \sqrt{-4x^2} + x - 15$
quadratic	quadratic	polynomial but not quadratic	undefined in \mathbb{R}
$y = \frac{-x + x^2}{2x^2}$	$y = \sqrt{x} + x^2$	$y = x + 5$	$y = -0.5x + \pi x^2$
rational	radical	linear	quadratic

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10. Write the new equation of the parabola $y = x^2$ after the following:

a) A horizontal translation 4 units left and a vertical translation 7 units down.	$y = (x + 4)^2 - 7$
b) A reflection in the x-axis and a vertical translation 3 units up.	$y = -x^2 + 3 = y = -(x+0)^2 + 3$
c) A horizontal translation right by 10 units and a reflection in the x-axis.	$y = -(x - 10)^2$
d) A vertical translation 0.5 units down.	$y = x^2 - 0.5 = y = (x-0)^2 - 0.5$
e) A horizontal translation right by 3 units and vertical translation 5 units down.	$y = (x - 3)^2 - 5$

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11. If the point (3,9) is on the original parabola, what would the coordinates of this point become:

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

a) If the parabola was shifted (translated) up three units and left two units?

$$(x,y) \rightarrow (x-2, y+3)$$

$$(3,9) \rightarrow (1, 12)$$

down

b) If the parabola was reflected in the x-axis, translated vertically by one unit and horizontally right by 5 units?

$$y = -(x-5)^2 - 1$$

$$(x,y) \rightarrow (x+5, -y-1)$$

$$(3,9) \rightarrow (8, -10)$$