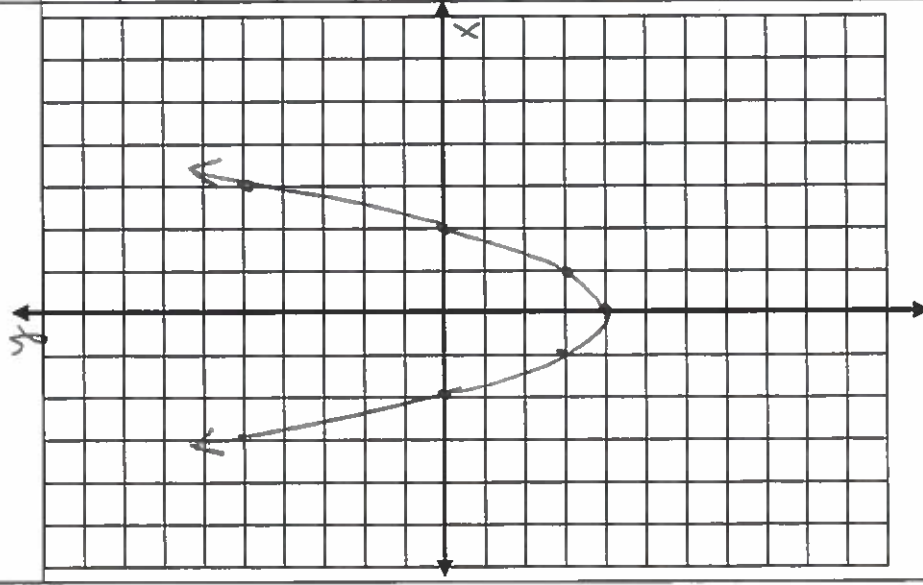
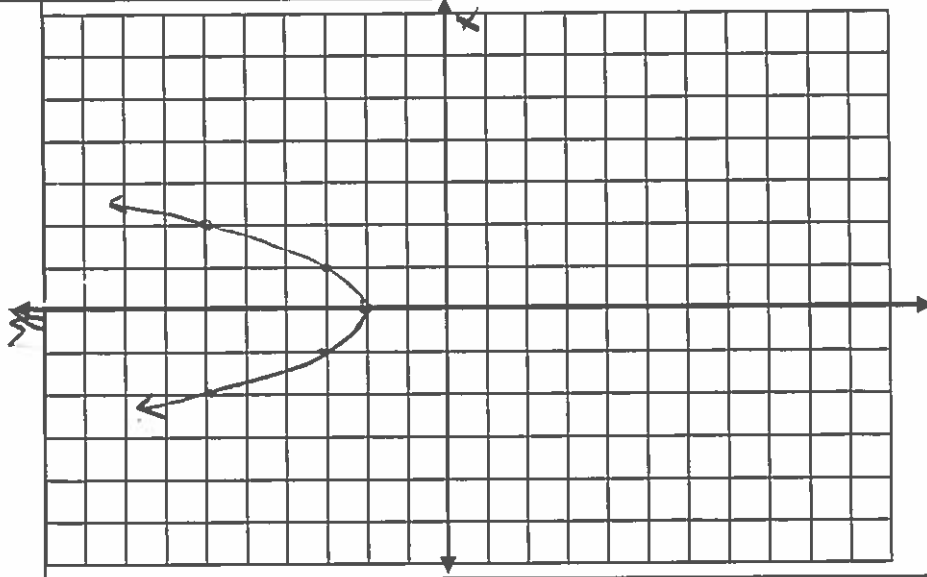


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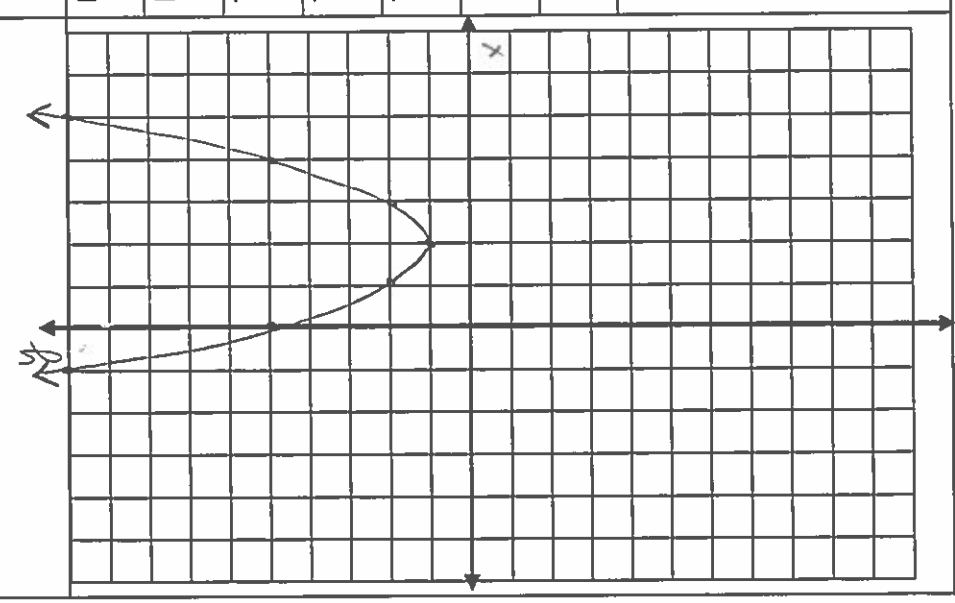
Translations of Quadratic Function – Assignment

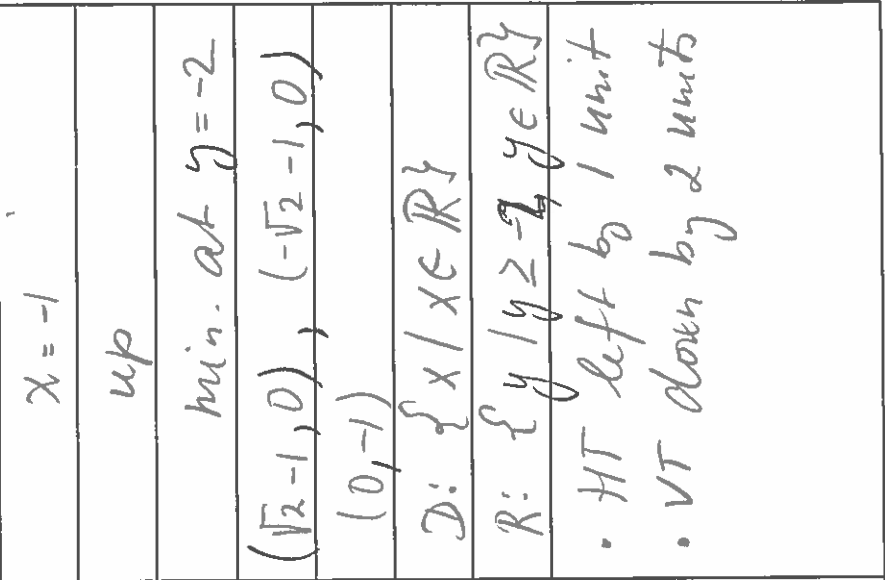
<p>1.</p> 	<p>Equation: $y = x^2 - 4$</p> <p>Equation of the axis of symmetry</p> <p>Direction of opening</p> <p>The maximum or minimum value</p> <p>The exact x-intercept(s) if they exist</p> <p>The exact y-intercept</p> <p>Domain</p> <p>Range</p> <p>Describe transformations of $y = x^2$ that generated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



Equation: $y = x^2 + 2$	Rewritten equation: $y = (x-0)^2 + 2$
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.

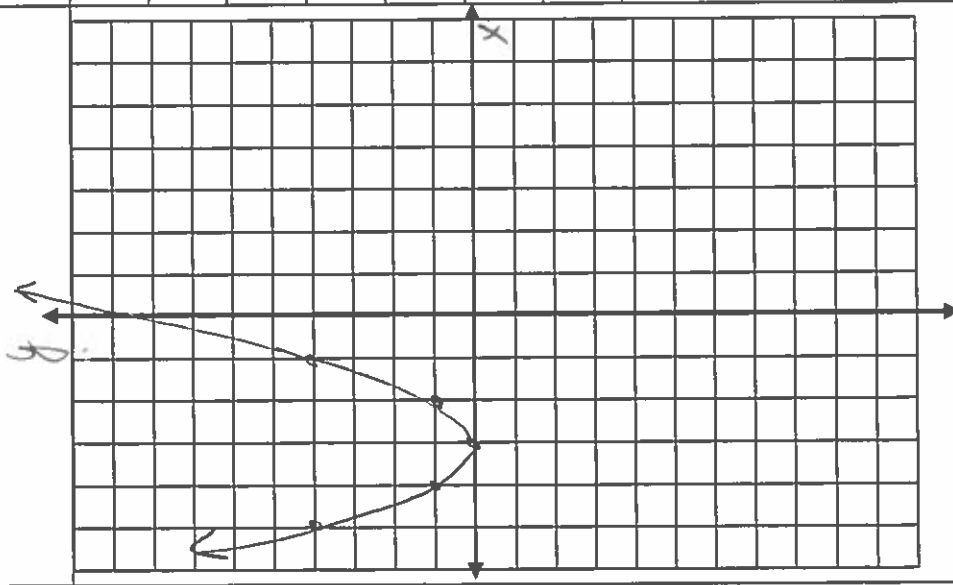
<p>3.</p> 	<p>Equation: $y = (x - 2)^2 + 1$</p>	<p>Rewritten equation: w/A</p>
<p>Equation of the axis of symmetry</p>	<p>$x = 2$</p>	
<p>Direction of opening</p>	<p>up</p>	
<p>The maximum or minimum value</p>	<p>min. at $y = 1$</p>	
<p>The exact x-intercept(s) if they exist</p>	<p>none</p>	
<p>The exact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

4.	Equation: $y = (x+1)^2 - 2$	Rewritten equation: N/A
	Equation of the axis of symmetry $x = -1$	
Direction of opening	up	
The maximum or minimum value	min. at $y = -2$	
The exact x-intercept(s) if they exist *	$(\sqrt{2}-1, 0), (-\sqrt{2}-1, 0)$	
The exact y-intercept	$(0, -1)$	
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.	<ul style="list-style-type: none"> • HT left by 1 unit • VT down by 2 units 	

* $y = (x+1)^2 - 2$
 $0 = (x+1)^2 - 2$
 $\sqrt{2} = \sqrt{(x+1)^2}$
 $\pm\sqrt{2} = x+1$

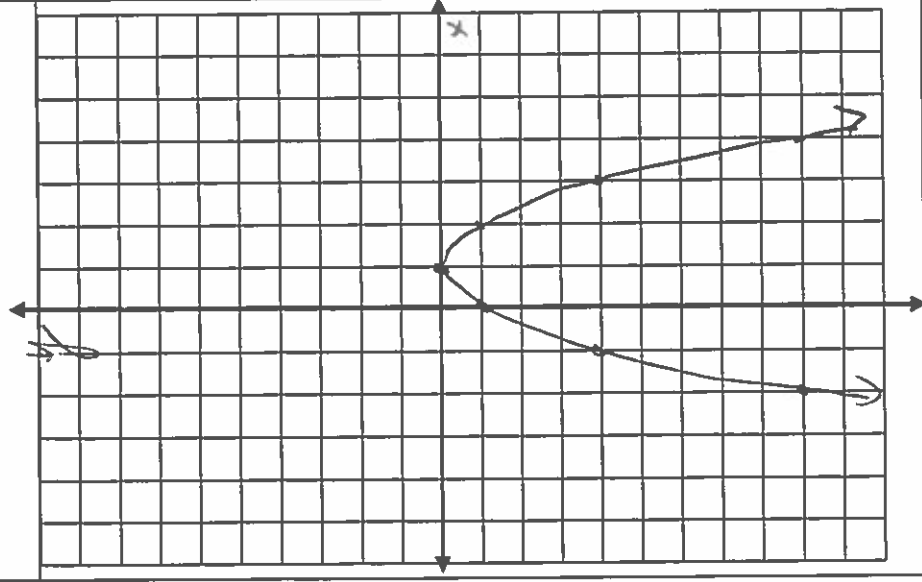
$x = \sqrt{2} - 1$
 $x = -\sqrt{2} - 1$

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



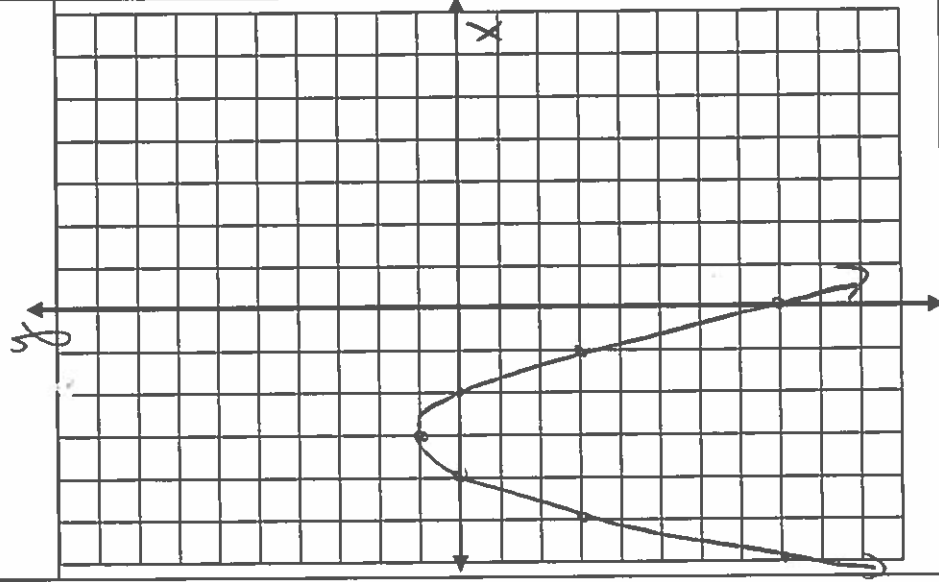
* $y = (x+3)^2$
 $y = (0+3)^2$
 $y = 3^2$
 $y = 9$ ✓

6.



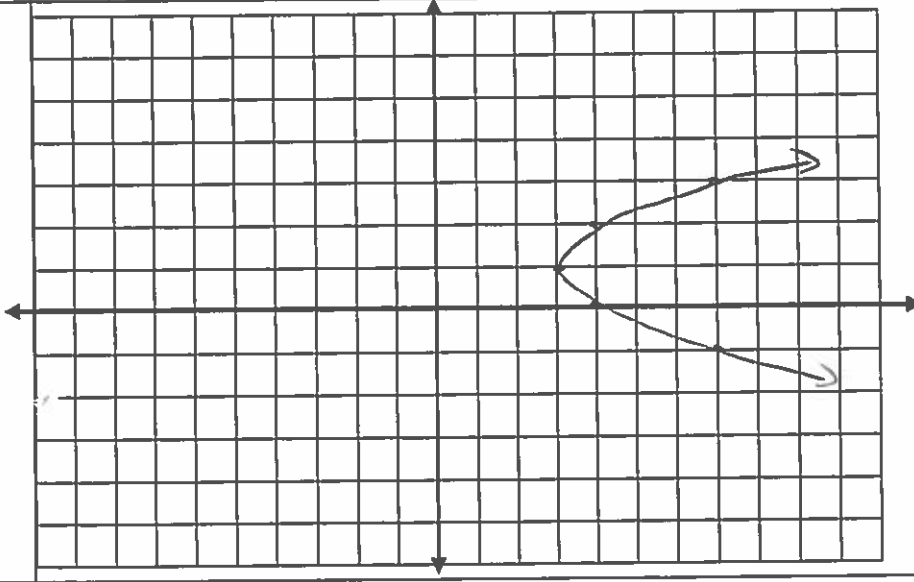
Equation:	$y = -(x-1)^2$	Rewritten equation:	$y = -(x-1)^2 + 0$
Equation of the axis of symmetry			$x = +1$
Direction of opening			down
The maximum or minimum value			max. at $y=0$
The exact x-intercept(s) if they exist			$(1, 0)$
The exact y-intercept			$(0, -1)$
Domain			$D: \{x x \in \mathbb{R}\}$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

7.



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

8.



Equation: $y = -(x-1)^2 - 3$	Rewritten equation: N/A
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

8

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:

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

2

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

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

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

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

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