Honors Algebra I Unit 3B – Graphing Quadratics Test Review

Name: _____ Date: _____

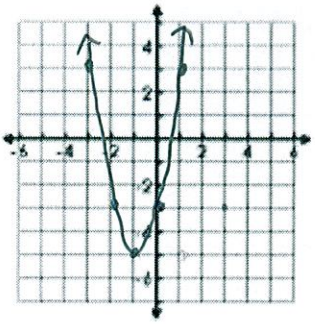
Unit 3B Review

Graph the following equation. Then, write the characteristics for the graph.

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

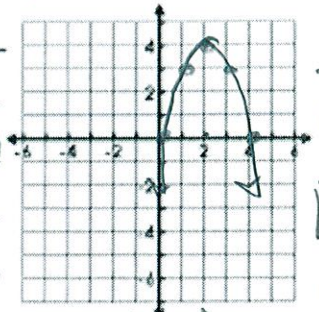
x	y
-3	3
-2	-3
-1	-5
0	-3
1	3

- Vertex: (-1, -5)
- Axis of Sym.: x = -1
- Domain: (-∞, ∞)
- Range: (-5, ∞)
- Increase: (-1, ∞)
- Decrease: (-∞, -1)



2. $y = -x^2 + 4x$ $x = \frac{-b}{2a} = \frac{-4}{2(-1)} = \frac{-4}{-2}$

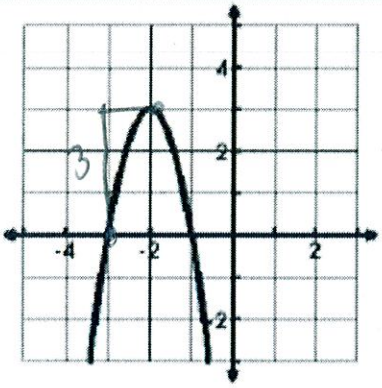
- Vertex: (2, 4)
- Axis of Sym.: x = 2
- Zeroes: (0, 0) (4, 0)
- Y-int: (0, 0)
- Increase: (-∞, 2)
- Decrease: (2, ∞)



$-x(x-4)$

x	y
0	0
1	3
2	4
3	3
4	0

2.



- Describe the transformations:
  Reflection
  Up 3, left 2
  Stretch 3
- Write the equation:
  $-3(x+2)^2 + 3$
- Roots: (-1, 0) (-3, 0)
- Avg. Rate of Change
  $-3 \le x \le -2$: 3
  (-3, 0) (-2, 3) $\frac{3-0}{-2-3}$
- End Behavior:
  As $x \to \infty$, $y \to$ -∞
  As $x \to -\infty$, $y \to$ -∞

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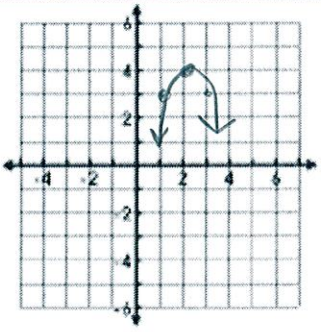
3. Sketch the quadratic function using the given information:

Domain: $\mathbb{R}$ (-∞, ∞) V: (2, 4)

Range: $y \le 4$ (-∞, 4)

Increasing: $-\infty < x < 2$ (-∞, 2]

Decreasing: $2 < x < \infty$ [2, ∞)



Describe the transformations to the parent function in the given equations.

4. $y = -(x+2)^2 - 5$
   Reflection Left Down

5. $y = 3(x-4)^2 + 2$
   Stretch Right Up

Write the quadratic equation of the graph that has been....

6. shifted down 1 and shrunk by a factor of $\frac{1}{2}$ $\frac{1}{2}(x-0)^2 - 1$ OR $\frac{1}{2}x^2 - 1$

7. reflected over the x-axis and has shifted right 2 $-(x-2)^2$

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Change the equation to standard form.

8. $y = 2(x-1)^2 + 4$

$2(x^2 - 2x + 1) + 4$

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

$\boxed{2x^2 - 4x + 6}$

Solve for t.

9. $10 = -16t^2 + 20t + 6$

$0 = -16t^2 + 20t - 4$

$b^2 - 4ac$

$(20)^2 - 4(-16)(-4)$

144

$\frac{-20 \pm \sqrt{144}}{-32}$

$\frac{-20+12}{-32}$ $\frac{-20-12}{-32}$

0.25

1

Change the equation to vertex form.

10. $y = -3x^2 + 6x - 2$

$x = \frac{-b}{2a} = \frac{-6}{2(-3)}$

$x = 1$

$-3(x-1)^2 + 1$

$-3(1)^2 + 6(1) - 2$

Change the equation to root form. FACTORED form

11. $y = 2x^2 + 14x - 36$

$(2x + 18)(x - 2)$

$2(x^2 + 7x - 18)$

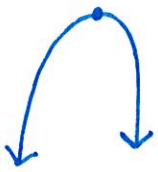
$2(x + 9)(x - 2)$

vertex

$2(x + 3.5)^2 - 60.5$

12. An object is projected into the air with a path described by the function $h(t) = -16t^2 + v_0 t + h_0$ where h is the height above the ground in feet and t is the time in seconds since the object started along the path. The initial velocity of the object is 96 ft/sec and the initial height of the ball is 160 ft. $h(t) = -16t^2 + 96t + 160$

MAX vertex



a. Find the time the object changes direction. $x = \frac{-b}{2a} = \frac{-96}{2(-16)} = 3$ sec

b. Find the maximum height of the object.

$-16(3)^2 + 96(3) + 160 = 304$ ft

c. Describe the location of the object at 2.5 seconds and determine if it's increasing or decreasing.

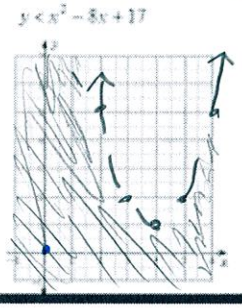
$-16(2.5)^2 + 96(2.5) + 160 = 300$ ft

increasing

13. Graph the inequality.

$y < x^2 - 8x + 17$

$0 < 17$ ✓



x	y
2	5
3	2
4	1
5	2
6	5

14. Solve and graph. (Answer as an inequality statement)

$10x - 16 \geq x^2$

$0 \geq x^2 - 10x + 16$

$0 \geq (x - 8)(x - 2)$

$0 \geq 8$ $0 \geq 2$ NO

14. Compare the vertex, y-intercept, and rate of change from $x_1 = 1$ to $x_2 = 2$ for each of the following functions.

a) $y = -x^2 + 4x + 6$

Greatest → y int: (0,6)

$x = \frac{-b}{2a} = \frac{-4}{2(-1)} = +2$

higher → Vertex: (+2, 10)

ROC: $\frac{10 - 9}{2 - 1} = 1$

b)

x	y
0	-26
* 1	-12
* 2	-2
3	4
4	6
5	4
6	-2

y int

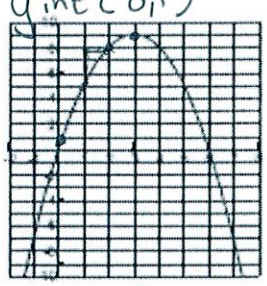
vertex

* ROC: $\frac{-2 - -12}{2 - 1} = \frac{10}{1}$

c)

y int (0,1)

(3, 9)



ROC: 3