Unit 6 Review
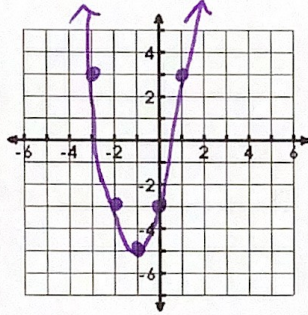
Graph the following equation. Then, write the characteristics for the graph.
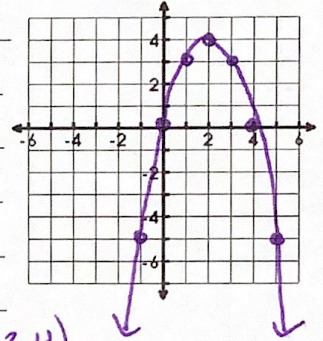
1. $y = 2(x+1)^2 - 5$

- Vertex: $(-1, -5)$
- Axis of Sym.: $X = -1$
- Domain: $(-\infty, \infty)$
- Range: $[-5, \infty)$
- Increase: $(-1, \infty)$
- Decrease: $(-\infty, -1)$
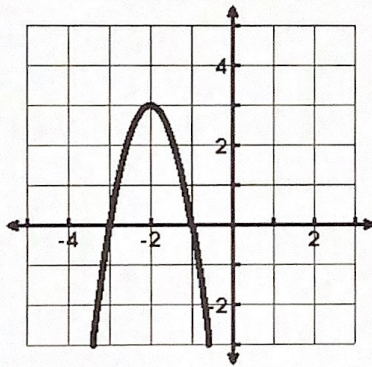- End Behavior: $x \to \infty$, $y \to \infty$ $x \to -\infty$, $y \to \infty$

2. $y = -x^2 + 4x$

- Vertex: $(2, 4)$
- Axis of Sym.: $X = 2$
- Zeroes: $X = 0, 4$
- Y-int: $(0, 0)$
- Increase: $(-\infty, 2)$
- Decrease: $(2, \infty)$
- Extrema: $max @ (2, 4)$

3.

- Describe the transformations:
  * Reflects x-axis
  * Vertical Stretch 3
  * Left 2, * Up 3
- Write the equation in vertex form: $y = -3(x+2)^2 + 3$
- Roots: $X = -3, -1$
- Avg. Rate of Change
  $-3 \le x \le -2$: $\underline{3}$

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

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

* Reflect x-axis, * Left 2, * Down 5

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

* Vertical Stretch 3   * Right 4   * Up 2

Write the quadratic equation of the graph in vertex form that has been….

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

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

Change the equations to standard form.

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

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

9. $y = -(x+4)^2 - 6$

$y = -x^2 - 8x - 22$

Change the equations to vertex form. SHOW ALL WORK by hand.

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

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

11. $y = 2x^2 + 8x + 1$

$$g(x) = 2(x+2)^2 - 7$$

An object is projected into the air with a path described by the function $h(t) = -16t^2 + 96t + 160$ where h is the height above the ground in feet and t is the time in seconds since the object started along the path.

12. Find the time the object changes direction.

The object changes direction @ 3 seconds.

13. Find the maximum height of the object.

The max height is 304 ft.

14. Describe the location of the object at 2.5 seconds.

The object is @ 300ft going up!

15. Compare: Which quadratic has the highest y-intercept? Which quadratic has the steepest rate of change from $x_1 = 1$ to $x_2 = 2$?

RoC: $\frac{(1,5)}{(2,8)} = 3$

Highest
y-int:

A. $y = -x^2 + 4x + 6$

(0,6)

RoC: $\frac{(1,9)}{(2,10)} \to 1$

B.

y-int:
(0,-26)

X	Y
0	-26
1	-12
2	-2
3	4
4	6
5	4
6	-2

RoC:
= 10

* Steepest RoC

C.
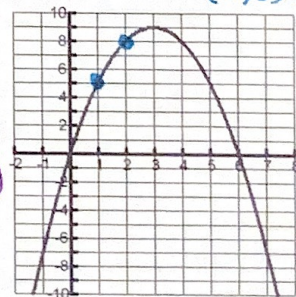
y-int:
(0,0)

16. Find the point(s) of intersection for the following system:
$$f(x) = 2x^2 + 7x + 6$$
$$g(x) = 3x^2 + 5x - 9$$

$$2x^2 + 7x + 6 = 3x^2 + 5x + 9$$

(-3, 3)
(5, 91)