Name: Date:

**9.1-9.2 Review 1**

**Standard Form of a Quadratic Function:** $y = ax^2 + bx + c$

**"a" effects:** wide / narrow — ex: $\frac{1}{2}$ ex: 2 **"c" effects:** y intercept (0, c)

**Steps: How to Find a Vertex of a Quadratic** $f(x) = 5x^2 + 10x - 4$

1. Find x, $x = \frac{-b}{2a}$
2. Sub in x to find y

$x = \frac{-10}{2(5)} = -1 = x$

$5(-1)^2 + 10(-1) - 4$

$5(1) - 10 - 4 = -9 = y$

Vertex form: $y = a(x-h)^2 + k$ $(-1, -9)$

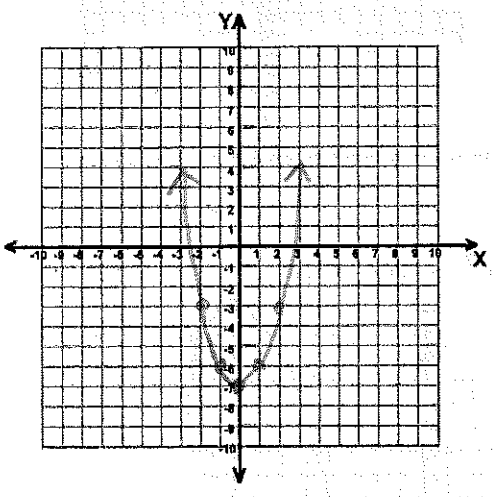
**Graphing by Translation:**

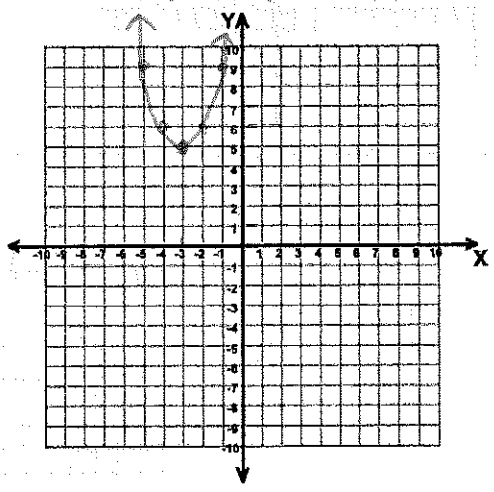
Up/ Down: k → as is **Left/ Right:** h → opposite

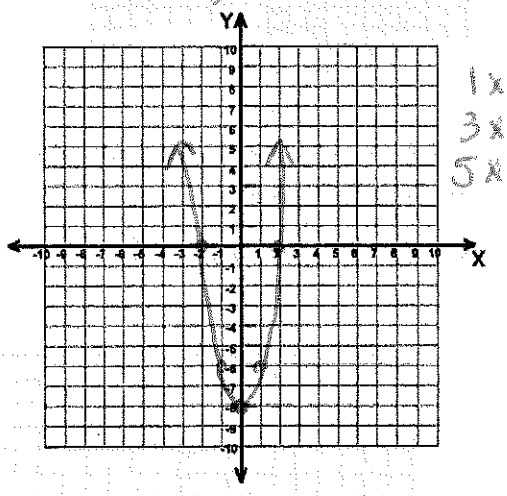
Narrower: $a \leq -1, a \geq 1$ **Wider:** $-1 < a < 1, a \neq 0$

Write what happens to each graph by translation on the line before graphing.

1. $y = x^2 - 7$ down 7
2. $y = (x+3)^2 + 5$ left 3, up 5
3. $y = 2x^2 - 8$ down 8, stretch 2







1 x 2 = 2
3 x 2 = 6
5 x 2 = 10

**Falling/ Thrown Object Equation:** $h = -16t^2 + 46t + 6$

h: height (ft) t: time (seconds) v: velocity (ft/s) c: 6 ft above ground.

Example: **Tbl Set:** x: -10, 10, y: -10, 50

**A baseball player hit a ball with an upward velocity of 46 ft/s. Its height *h* in feet after *t* seconds is given by the function $h = -16t^2 + 46t + 6$. What is the maximum height the ball reaches? How long will it take the baseball to reach the maximum height?**

**How long does it take for the ball to hit the ground?**

1) $x = \frac{-46}{2(-16)}$ 39.06 ft

2) 1.44 seconds

3) 3 seconds.

3) h = 0

Extra Practice:

1. **A golf ball is chipped into the air from a small hill with an upward velocity of 50 ft/s. Its height $h$ in feet after $t$ seconds is given by the function $h = -16t^2 + 50t + 10$. What is the maximum height the ball reaches? How long will it take the ball to reach the maximum height? How long does it take for the ball to hit the ground?**

1)


2) 1.5625 seconds

3) $-16t^2 + 50t + 10 = 0$
2nd trace zero
$x = 3.314$ seconds

$x = \frac{-50}{2(-16)} = 1.5625$

$-16(1.5625)^2 + 50(1.5625) + 10 = 49.0625$ ft

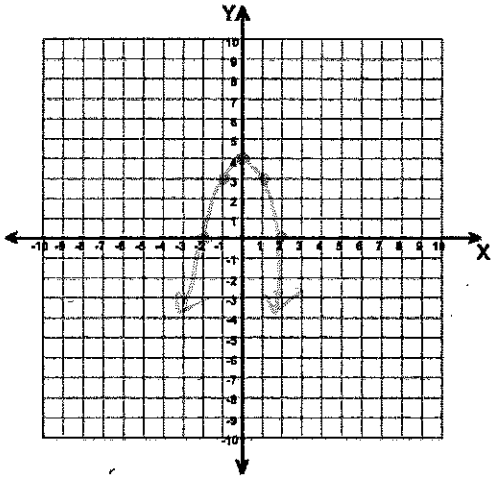
Write what happens to each graph by translation on the line before graphing.

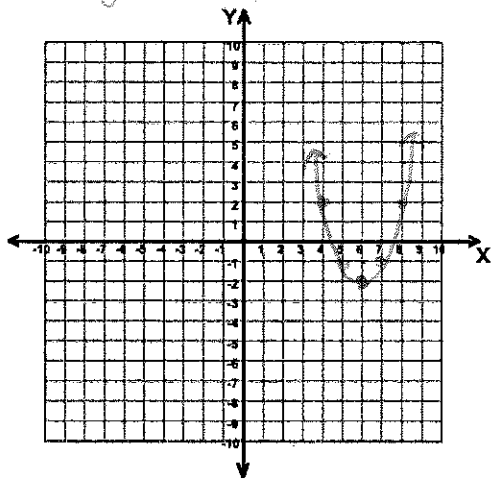
2. $y = -x^2 + 4$ up 4, opens down

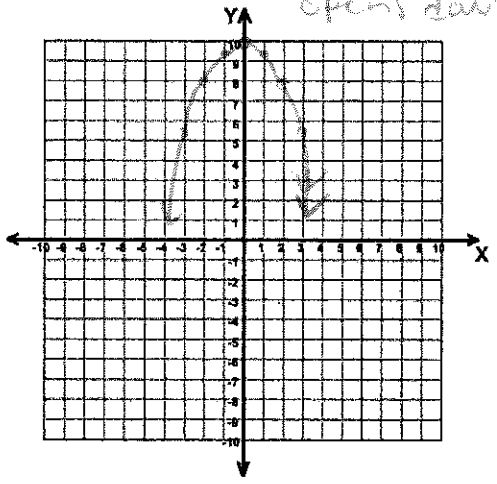
3. $y = (x-6)^2 - 2$ right 6, down 2

4. $y = -\frac{1}{2}x^2 + 10$ up 10, compress $\frac{1}{2}$, opens down

$1 \times -\frac{1}{2} = -\frac{1}{2}$
$3 \times -\frac{1}{2} = -1\frac{1}{2}$
$5 \times -\frac{1}{2} = -2\frac{1}{2}$



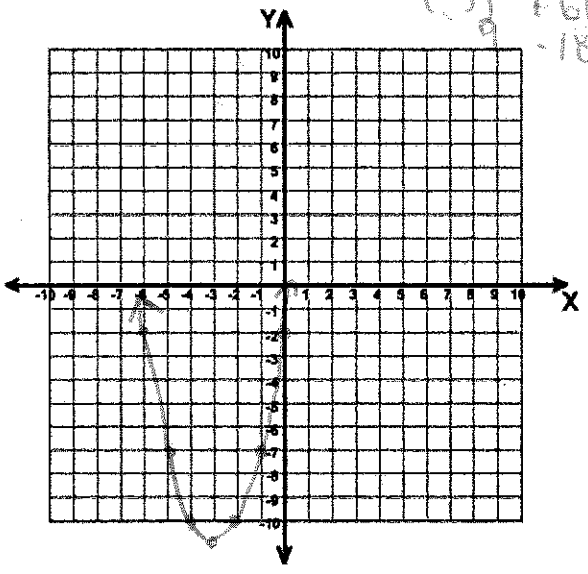




Graph the quadratic function without a calculator. Show all work. You must find at least five points and label the vertex and axis of symmetry.

5. $f(x) = x^2 + 6x - 2$

$x = \frac{-6}{2(1)} = -3$

$(-3)^2 + 6(-3) - 2$
$9 - 18 - 2 = -11$

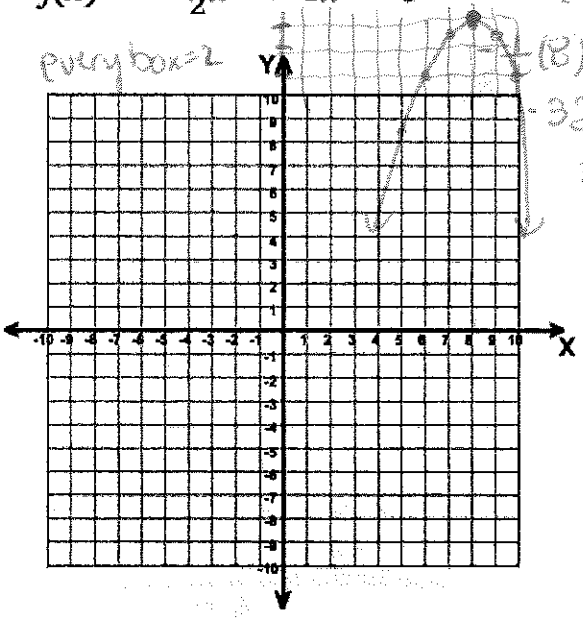



6. $f(x) = -\frac{1}{2}x^2 + 8x - 6$

$x = \frac{-8}{2(-\frac{1}{2})} = 8$

every box = 2

$-(8)^2 + 8(8) - 6$
$-32 + 64 - 6$
$32 - 6$
$26$



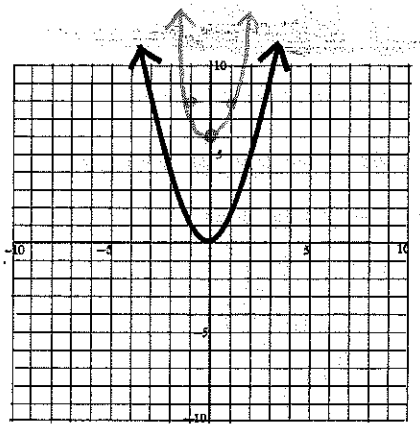
Name_____ Period_____

9.1-9.2 Review
Algebra I Quadratic Emphasis

Graph by translation. State the domain and range.

Graph the function. State the domain and range.

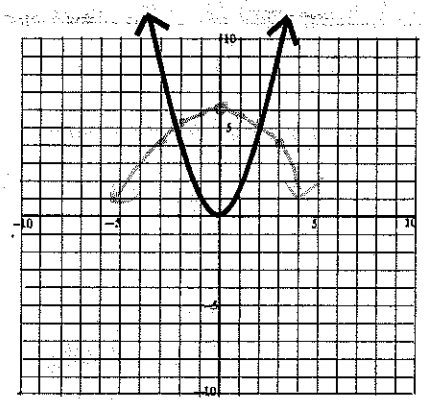
1. $y = 2x^2 + 6$



Domain: R

Range: $y \geq 6$

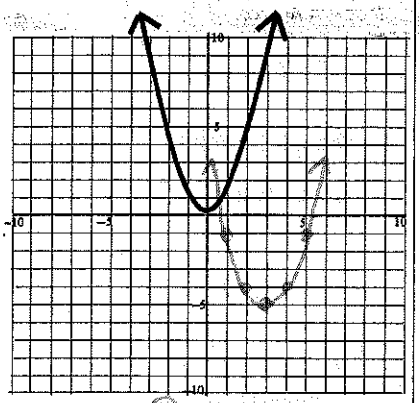
2. $f(x) = -\frac{1}{5}x^2 + 6$



Domain: R

Range: $y \leq 6$

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

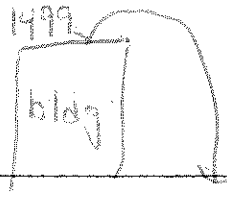


Domain: R

Range: $y \geq -5$

4. Aiden threw a penny off of the observation deck of the John Hancock building. If he was 1499 ft high, how long until the penny hits the sidewalk below? (use your calculator) Hint: $y = -16t^2 + c$

About 10 seconds




$0 = -16t^2 + 1499$

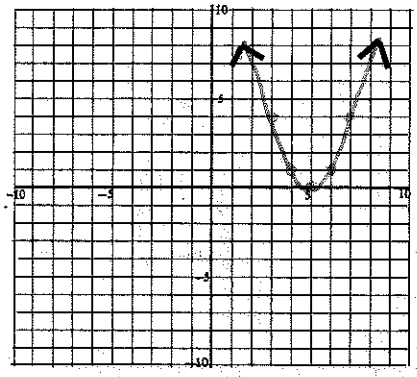
$\frac{-1499}{-16} = t^2$

$93.68 = t^2$

$9.67 \approx t$

Identify the domain and range of the following functions:

5.



Domain: R

Range: $y \geq 0$

6. $y = -3x^2 + 5$

Domain: R

Range: $y \leq 5$

7. Use the equation from #4.

$x = \frac{-0}{2(-16)} = 0$

$-16(0)^2 + 1499$

Domain: R

Range: $y \leq 1499$

Find the coordinates for the vertex of the following functions **without** a calculator:

| 8. $y = x^2$ | 9. $y = -x^2 + 5$ | 10. $y = (x-4)^2 + 3$ |
|---|---|---|
| (0, 0) | (0, 5) | (4, 3) |

Find the coordinates for the vertex of the following functions **with** a calculator (round to two decimal places):

| 11. $y = 5x^2 - 17x + 9$ | 12. $y = -13x^2 + 24x + 4$ |
|---|---|
| $x = \frac{17}{2(5)} = 1.7$ | $x = \frac{-24}{2(-13)} =$ |
| (1.70, -5.45) | (.92, 15.08) |

Graph the two quadratic functions below without a calculator. Show all your work and include at least 5 points on each parabola.

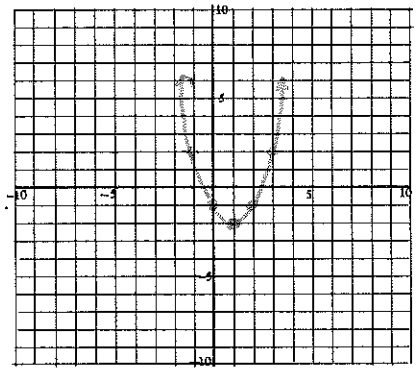
13. $y = x^2 - 2x - 1$

$x = \frac{2}{2(1)} = 1$

$(1)^2 - 2(1) - 1 = -2$

Axis of Symmetry: $x = 1$

Vertex: (1, -2)



14. $y = -\frac{3}{2}x^2 + 6x + 2$

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

$-\frac{3}{2}(2)^2 + 6(2) + 2$

$-\frac{3}{2}(4) + 12 + 2$

$-3(2) + 12 + 2$

$6 + 2$

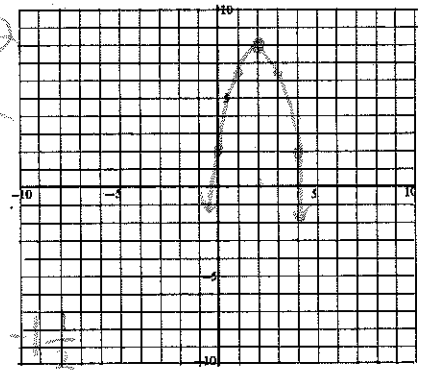
$1 \times \frac{3}{2} = 1\frac{1}{2}$

$3 \times \frac{3}{2} = 4\frac{1}{2}$

$5 \times \frac{3}{2} = 7\frac{1}{2}$

Axis of Symmetry: $x = 2$

Vertex: (2, 8)

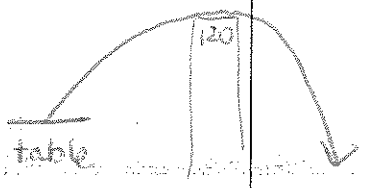


Use the formula $y = -16t^2 + vt + c$ to solve the following problems (calculator allowed):

15. You are setting off fireworks for the 4th of July. According to safety regulations, you need to set off the fireworks so that they clear a height of 120 ft. If you set the fireworks off on a table with a height of 7ft, at an upward velocity of 80 ft/s will you satisfy the safety regulations? Show the work to defend your answer.

$y = -16t^2 + 80t + 7$

$120 = -16t^2 + 80t + 7$




find max height!

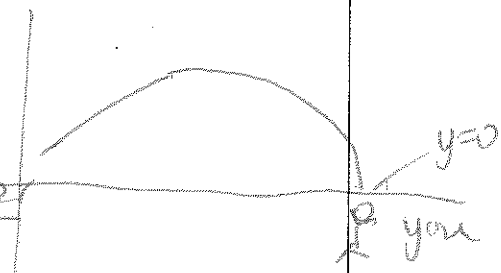
$x = \frac{-80}{2(-16)} = 2.5$ $\quad -16(2.5)^2 + 80(2.5) + 7$

$= 107$ ft

yes

16. You are having an intense snowball fight. Your opponent brings out a snow ball launcher that is 3 ft off the ground and launches the snow balls at an upward velocity of 25ft/sec. They just launched the first snow ball. How long do you have to take cover before the snow ball reaches its destination (a.k.a you)?

$y = -16t^2 + 25t + 3$

$0 = -16t^2 + 25t + 3$

1.67 seconds