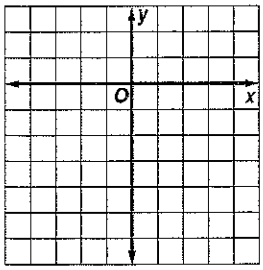
NAME _____ DATE _____ PERIOD _____

9-1 Practice

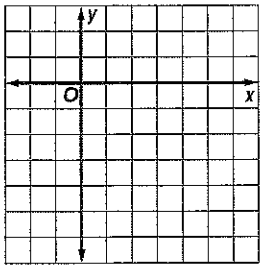
Graphing Quadratic Functions

Use a table of values to graph each function. Determine the domain and range.

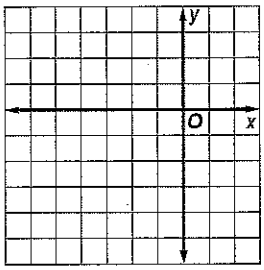
1. $y = -x^2 + 2$



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



3. $y = -2x^2 - 8x - 5$



Find the vertex, the equation of the axis of symmetry, and the *y*-intercept of the graph of each function.

4. $y = x^2 - 9$

5. $y = -2x^2 + 8x - 5$

6. $y = 4x^2 - 4x + 1$

Consider each equation. Determine whether the function has a *maximum* or a *minimum* value. State the maximum or minimum value. What are the domain and range of the function?

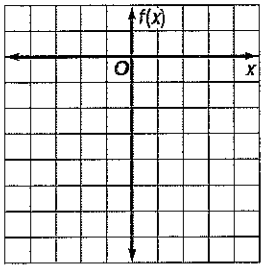
7. $y = 5x^2 - 2x + 2$

8. $y = -x^2 + 5x - 10$

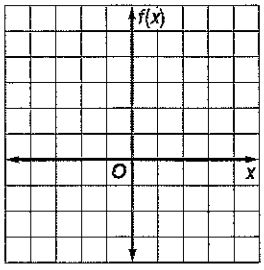
9. $y = \frac{3}{2}x^2 + 4x - 9$

Graph each function.

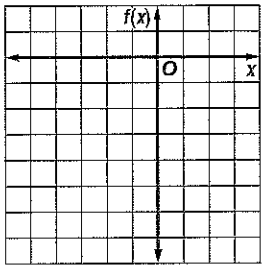
10. $f(x) = -x^2 + 1$



11. $f(x) = -2x^2 + 8x - 3$



12. $f(x) = 2x^2 + 8x + 1$



13. BASEBALL The equation $h = -0.005x^2 + x + 3$ describes the path of a baseball hit into the outfield, where h is the height and x is the horizontal distance the ball travels.

a. What is the equation of the axis of symmetry?

b. What is the maximum height reached by the baseball?

c. An outfielder catches the ball three feet above the ground. How far has the ball traveled horizontally when the outfielder catches it?

Graphing Quadratics Practice

Name: _____ Date: _____ Hour: _____

Determine whether each function has a *maximum* or *minimum* value, and find that value.

1) $f(x) = -x^2 + 6x - 1$

2) $f(x) = x^2 + 3x - 12$

3) $g(x) = 3x^2 + 8x + 5$

4) $p(x) = -4x^2 + 10x - 6$

Complete parts a-c for each quadratic function.

a) Find the y-intercept.
b) Find the equation of the axis of symmetry.
c) Find the coordinates of the vertex.

5) $f(x) = x^2 - 6x + 8$

6) $g(x) = -2x^2 + 3x + 9$

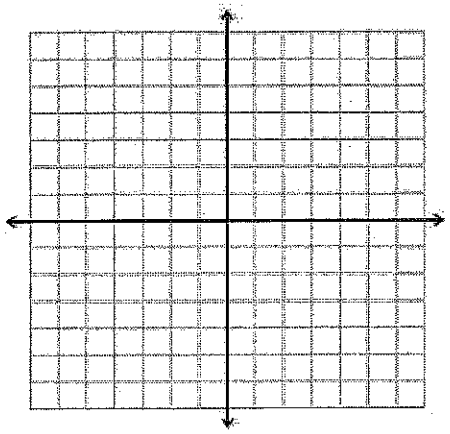
7) $h(x) = -3x^2 + 5$

8) $f(x) = x^2 - 3x - 10$

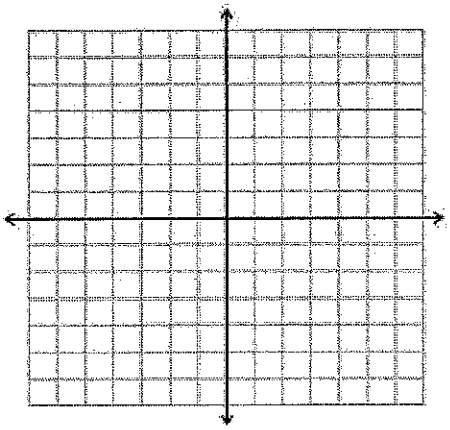
Graphing Quadratics Practice

Graph each function.

9) $f(x) = -2x^2 + 4x + 1$



10) $f(x) = 3x^2 - 6x - 1$



11) The height of a baseball thrown into the air can be represented by the equation $h = -16t^2 + 70t + 6$, where h is the height (in feet) of the ball after t seconds.

a) Find the height of the ball after 3 seconds.

b) After **how many seconds** will the ball be at it's *highest point* and **how high** will it be?

12) Use the quadratic formula to find the solutions to the quadratic function $f(x) = 4x^2 + 8x + 3$/

Word Problem Practice - Quadratics

Name: _____ Date: _____ Hour: _____

1) Olympics were held in 1896 and have been held every four years except 1916, 1940, and 1944. The winning height y in men's pole vault at any number Olympiad x can be approximated by the equation $y = 0.37x^2 + 4.3x + 126$. Complete the table to estimate the pole vault height in each of the Olympic Games. Round your answers to the nearest tenth.

Year	Olympiad (x)	Height (y inches)
1896	1	
1900	2	
1924	7	
1936	10	
1964	15	
2008	26	

Source: National Security Agency

2) Mr. Walthorn's physics class investigates what happens when a ball is given an initial push, rolls up, and then back down an inclined plane. The class finds that $y = -x^2 + 6x$ accurately predicts the ball's position y after rolling x seconds. On the graph of the equation, what would be the y-value when $x = 4$?

Word Problem Practice - Quadratics

3) A hotel's main entrance is in the shape of a parabolic arch. The equation $y = -x^2 + 10x$ models the arch height y for any distance x from one side of the arch. Determine the vertex of the graph in order to determine its maximum height.

4) Olympic softball gold medalist Michele Smith pitches a curveball with a speed of 64 feet per second. If she throws the ball straight upward at this speed, the ball's height h in feet after t seconds is given by $h = -15t^2 + 64t$. Find the coordinates of the vertex of the graph of the ball's height and interpret its meaning.

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9-3 Skills Practice

Transformations of Quadratic Functions

Describe how the graph of each function is related to the graph of $f(x) = x^2$.

1. $g(x) = x^2 + 2$

2. $g(x) = (x - 1)^2$

3. $g(x) = x^2 - 8$

4. $g(x) = 7x^2$

5. $g(x) = \frac{1}{5}x^2$

6. $g(x) = -6x^2$

7. $g(x) = -x^2 + 3$

8. $g(x) = 5 - \frac{1}{2}x^2$

9. $g(x) = 4(x - 1)^2$

Match each equation to its graph.

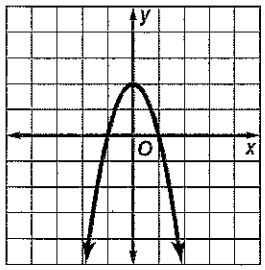
10. $y = 2x^2 - 2$

11. $y = \frac{1}{2}x^2 - 2$

12. $y = -\frac{1}{2}x^2 + 2$

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

A.



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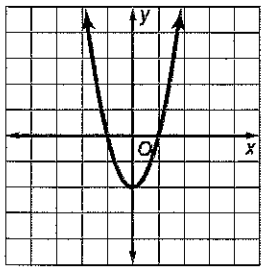

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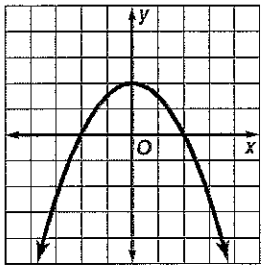

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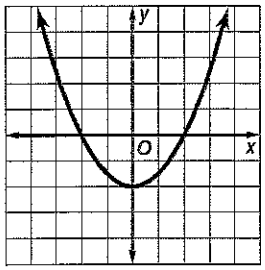

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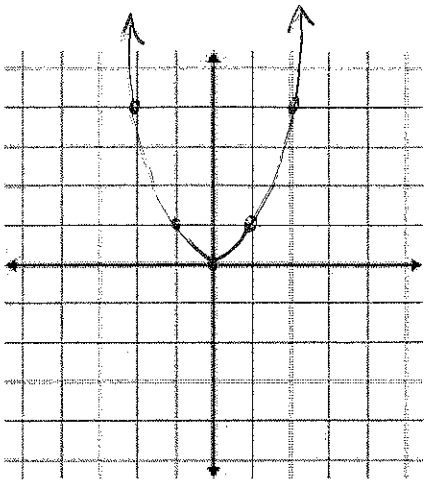
Guided Notes: Transformations of Quadratic Functions

The parent function of the family of quadratics is: $f(x) = x^2$.

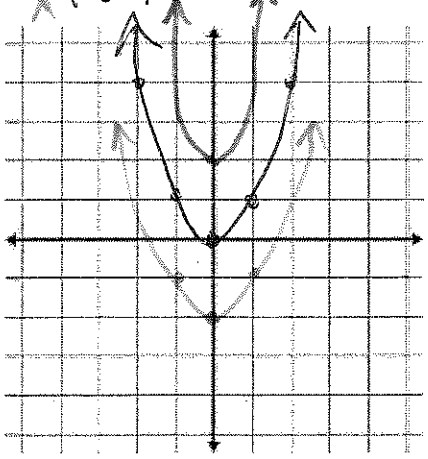


This is the starting position for graphs before they are translated, dilated, and/or reflected.

Translation: when your graph moves up, down, left and/or right

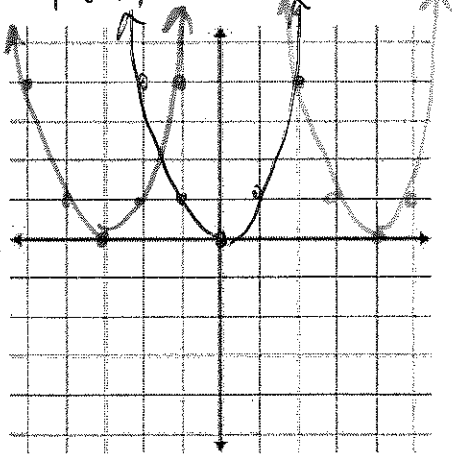
Vertical Translations:

- $f(x) = x^2 + k$ (up) k = some number
- $f(x) = x^2 - k$ (down)



Horizontal Translations:

- $f(x) = (x-k)^2$ right
- $f(x) = (x+k)^2$ left



Dilations: when your graph stretches or compresses (shrinks)

When the parent function $f(x) = x^2$ is multiplied by a constant a, the graph of the resulting function $f(x) = ax^2$ is either stretched or compressed (shrunk) vertically.

If $|a| > 1$, stretches vertically

If $0 < |a| < 1$, compressing vertically

$f(x) = 3x^2$

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

Describe how the graph of each function is related to the graph of $f(x) = x^2$.

a) $m(x) = x^2 + 4$

$a > 0$ opening up minimum

- Moves up 4 units
- Opens up

b) $f(x) = (x - 3)^2 + 4$

- Moves right 3 units
- Moves up 4 units
- Opens up

c) $f(x) = x^2 - 3$

$a < 0$ opens down maximum

- Moves down 3 units
- Opens up

d) $g(x) = (x - 3)^2$

- Moves right 3
- Opens up

e) $h(x) = -\frac{1}{2}x^2$

- Opens down
- Compresses vertically

f) $g(x) = 3x^2 + 2$

- Stretched vertically
- Moves up 2
- Opens up

NAME _____ DATE _____ PERIOD _____

9-3 Practice

Transformations of Quadratic Functions

Describe how the graph of each function is related to the graph of $f(x) = x^2$.

1. $g(x) = (10 + x)^2$

2. $g(x) = -\frac{2}{5} + x^2$

3. $g(x) = 9 - x^2$

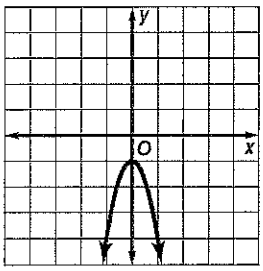
4. $g(x) = 2x^2 + 2$

5. $g(x) = -\frac{3}{4}x^2 - \frac{1}{2}$

6. $g(x) = -3(x + 4)^2$

Match each equation to its graph.

A.



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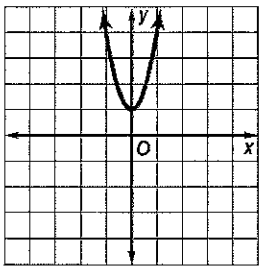

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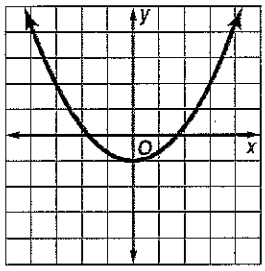

7. $y = -3x^2 - 1$

8. $y = \frac{1}{3}x^2 - 1$

9. $y = 3x^2 + 1$

List the functions in order from the most vertically stretched to the least vertically stretched graph.

10. $f(x) = 3x^2$, $g(x) = \frac{1}{2}x^2$, $h(x) = -2x^2$

11. $f(x) = \frac{1}{2}x^2$, $g(x) = -\frac{1}{6}x^2$, $h(x) = 4x^2$

12. PARACHUTING Two parachutists jump at the same time from two different planes as part of an aerial show. The height h_1 of the first parachutist in feet after t seconds is modeled by the function $h_1 = -16t^2 + 5000$. The height h_2 of the second parachutist in feet after t seconds is modeled by the function $h_2 = -16t^2 + 4000$.

a. What is the parent function of the two functions given?

b. Describe the transformations needed to obtain the graph of h_1 from the parent function.

c. Which parachutist will reach the ground first?