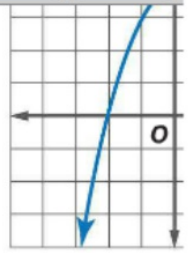
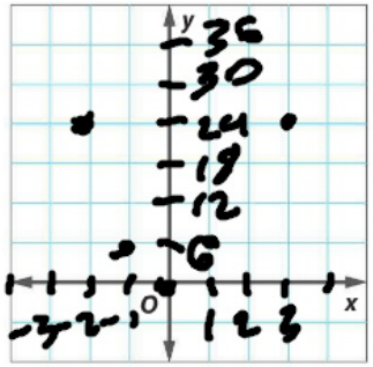
Glossary Index

−2	$-(-2)^2+4=0$	0	(−2, 0)
−1	$-(-1)^2+4=3$	3	(−1, 3)
0	$-(0)^2+4=4$	4	(0, 4)
1	$-(1)^2+4=3$	3	(1, 3)
2	$-(2)^2+4=0$	0	(2, 0)



Got It? Do this problem to find out.

a. Graph $y = 6x^2$.



$y=6x^2$

x	y
−2	$6(-2)^2$ = 24
−1	$6(-1)^2$ = 6
0	$6(0)^2$ = 0
1	$6(1)^2$ = 6
2	$6(2)^2$ = 24

(−2, 24)
(−1, 6)
(0, 0)
(1, 6)
(2, 24)

Student Review : Off On

$-x^2+5$

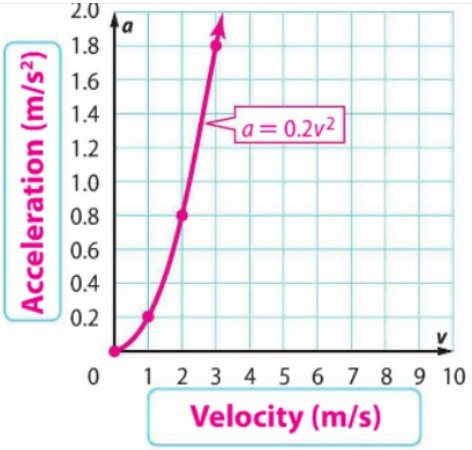
Guilded Practice

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

x	$-5x^2$	y
-2	$-5(-2)^2$	-20
-1	$-5(-1)^2$	-5
0	$-5(0)^2$	0
1	$-5(1)^2$	-5
2	$-5(2)^2$	-20

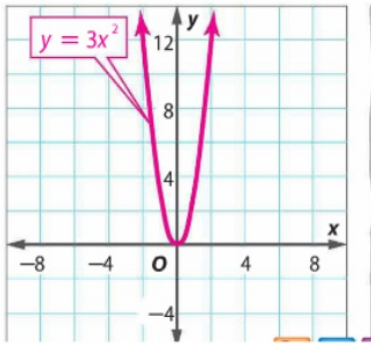
1. The function $a = 0.2v^2$ models the acceleration of a carnival ride, where a is the acceleration toward the center of the ride in meters per second every second and v is the velocity in meters per second. Graph this function. Then use your graph to estimate the velocity of the ride at an acceleration of 1 meter per second every second. (Examples 3 and 4)

Sample answer: about 2.2 mps

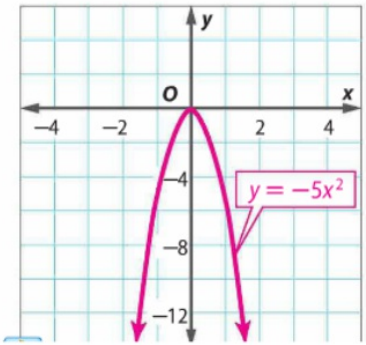


Graph each function. (Examples 1 and 2)

2. $y = 3x^2$



3. $y = -5x^2$

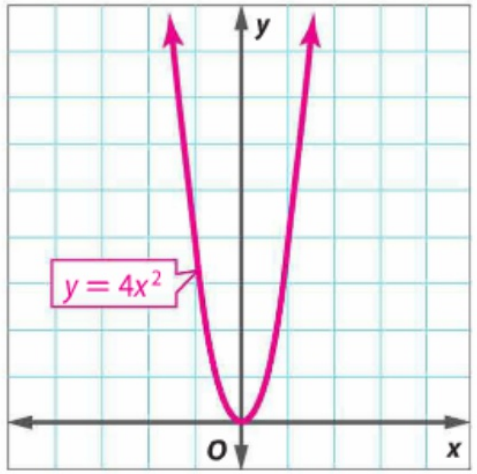


4. **Building on the Essential Question** When does the graph of a quadratic function open upward or downward?

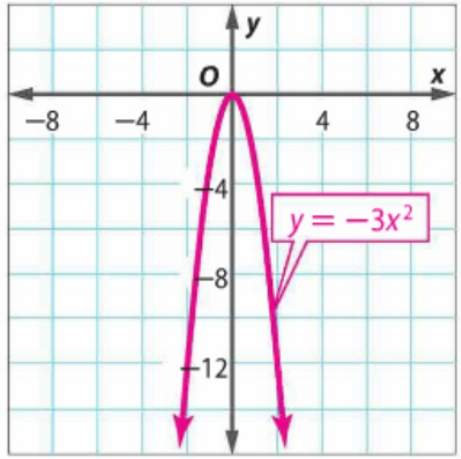
Sample answer: The graph opens upward if the coefficient of the variable that is squared is positive, downward if it is negative.

Graph each function. (Examples 1 and 2)

1 $y = 4x^2$



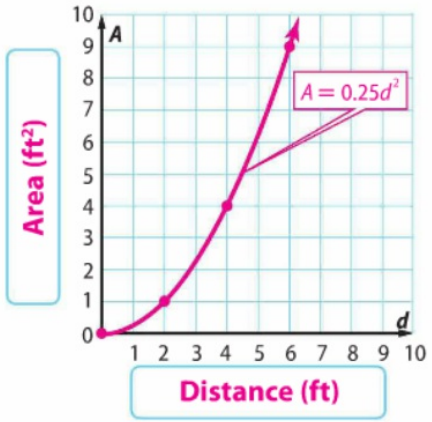
2. $y = -3x^2$



3 A penny is dropped from a height of 196 feet off a bridge. The function $d = -16t^2 + 196$ models the distance d in feet the penny is from the surface of the water at time t seconds. Graph this function. Then use your graph to estimate the time it will take for the penny to reach the water. (Examples 3 and 4) **about 3.5 s**

4. The area A in square feet of a projected movie on a movie screen can be represented by the equation $A = 0.25d^2$, where d represents the distance from a projector to the movie screen. Graph the function. Then use your graph to estimate the distance from the projector to a screen if the area of the movie is 7 square feet.

(Examples 3 and 4) **about 5.2 ft**



5. Anna has trim to make a rectangular border for a scrapbook page. The section inside the border is x inches long and $(12 - x)$ inches wide.

a. Write a function to represent the area A of the section inside the border. **$A = 12x - x^2$**

b. What should the dimensions of the section be to enclose the maximum area inside the border? (*Hint*: Graph the function and find the x-coordinate of the point at the peak of the graph.) **6 in. by 6 in.**

Identify Structure Without graphing, determine whether each equation represents a linear or nonlinear function. Explain.

6. $y = 3x$

linear; Sample answer: The equation is written in slope-intercept form so it is a straight line.

7. $y = 2x^2$

nonlinear; Sample answer: The function is quadratic.

8. $y = -3x^2$

nonlinear; Sample answer: The function is quadratic.

9. $y = -6x$

linear; Sample answer: The equation is written in slope-intercept form so it is a straight line.

10. $5x + y = 7$

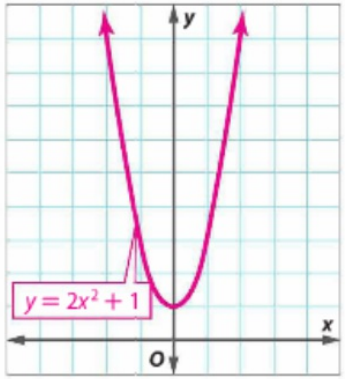
linear; Sample answer: The equation can be written in slope-intercept form so it is a straight line.

11. $7x^2 + y = 24$

nonlinear; Sample answer: The function is quadratic.

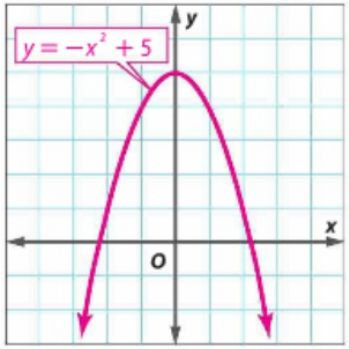
12. **Persevere with Problems** The graphs of quadratic functions may have exactly one highest point, called a *maximum*, or exactly one lowest point, called a *minimum*. Graph each quadratic equation. Determine whether each graph has a maximum or a minimum. If so, give the coordinates of each point.

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



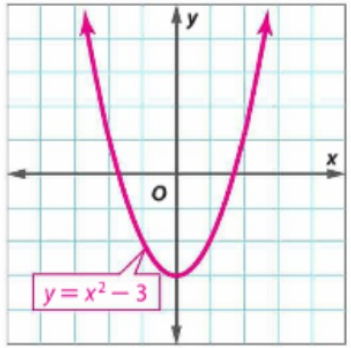
minimum; (0, 1)

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



maximum; (0, 5)

c. $y = x^2 - 3$



minimum; (0, −3)

13. **Model with Mathematics** Write the equation of a quadratic function that opens upward and has its minimum at (0, −3.5). **Sample answer: $y = x^2 - 3.5$**

14. **Reason Inductively** The equation $y = ax^2 + bx + c$ represents a quadratic function. What does the constant c represent? Explain. **the *y*-intercept; Sample answer: When a graph crosses the *y*-axis, $x = 0$. Substitute 0 for x in the equation, and $y = c$, so c represents the *y*-intercept.**