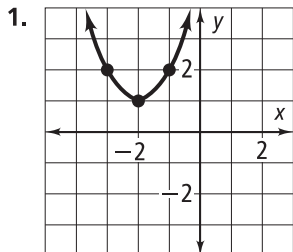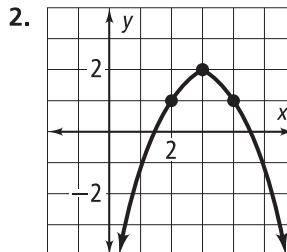# 9-1 Practice

Form K

Quadratic Graphs and Their Properties

Identify the vertex of each graph. Tell whether it is a maximum or a minimum.
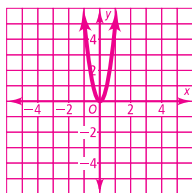
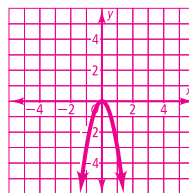**1.**

$(-2, 1)$; minimum

2.

$(3, 2)$; maximum

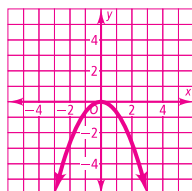**Graph each function.**

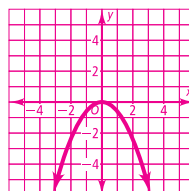**3.** $f(x) = 5x^2$

4. $f(x) = -3x^2$

5. $f(x) = -\frac{2}{3}x^2$

6. $f(x) = -\frac{3}{5}x^2$

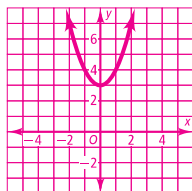**Order each group of quadratic functions from widest to narrowest graph.**

7. $y = -2x^2, y = -4x^2, y = -3x^2$

$y = -2x^2, y = -3x^2, y = -4x^2$
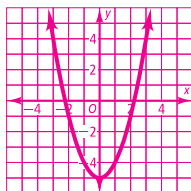
8. $y = \frac{1}{3}x^2, y = 3x^2, y = \frac{1}{6}x^2$

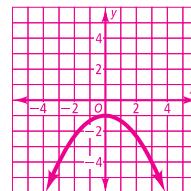$y = \frac{1}{6}x^2, y = \frac{1}{3}x^2, y = 3x^2$

Graph each function.

9. $f(x) = x^2 + 3$

**10.** $f(x) = x^2 - 5$

11. $f(x) = -\frac{1}{3}x^2 - 1$

9-1 Practice (continued) Form K

Quadratic Graphs and Their Properties

12. Jared is casting his fishing line with a lead sinker attached over the edges of a pier. The pier is 15 feet above the water. The function $h = -16t^2 + 15$ gives the sinker's height h above the water (in feet) after t seconds. Graph the function. How many seconds does it take for the sinker to hit the water?
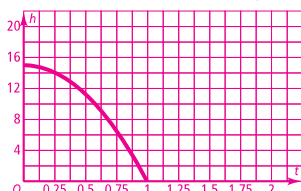
about 0.97 s

13. A roofer is going to drop his hammer to the ground from the roof after making sure the area is clear. The roof is 25 feet high. The function $h = -16t^2 + 25$ gives the hammer's height h above the ground (in feet) after t seconds. Graph the function. How many seconds does it take for the hammer to hit the ground?

1.25 s

Identify the domain and range of each function.

14. $y = 4x^2 - 3$
The domain is all real numbers.
The range is $y \geq -3$.

15. $y = -\frac{1}{4}x^2 - 2$
The domain is all real numbers.
The range is $y \leq -2$.

16. $y = \frac{2}{3}x^2 + 1$
The domain is all real numbers.
The range is $y \geq 1$.

17. $f(x) = -2x^2 + 6$
The domain is all real numbers.
The range is $y \leq 6$.

18. Writing Discuss how the graph of $y = x^2 - 7$ differs from the graph of $y = x^2$.

The graph of $y = x^2 - 7$ is shifted 7 units down.

19. Writing Explain how you can determine if the parabola has been shifted up or down by examining the equation.

If the equation is in the form $y = ax^2 + c$, the sign of c determines whether the parabola is shifted up or down. If c is positive, the parabola is shifted up c units. If c is negative, the parabola is shifted down c units.

20. Open-Ended Write the equation of a quadratic function for which the graph opens in the same direction as the graph of $y = x^2$, is wider than the graph of $y = x^2$, and is shifted up compared to the graph of $y = x^2$.

Sample answer: $y = 0.25x^2 + 3$