Name______________________________ Date__________

8.1 Practice A

In Exercises 1–6, graph the function. Compare the graph to the graph of $f(x) = x^2$.

1. $g(x) = 4x^2$
2. $h(x) = 1.5x^2$
3. $j(x) = \frac{1}{3}x^2$
4. $g(x) = -3x^2$
5. $k(x) = -\frac{5}{2}x^2$
6. $n(x) = -0.5x^2$

In Exercises 7–9, use a graphing calculator to graph the function. Compare the graph to the graph of $y = -5x^2$.

7. $y = 5x^2$
8. $y = -0.5x^2$
9. $y = -0.05x^2$

10. The arch support of a bridge can be modeled by $y = -0.00125x^2$, where x and y are measured in feet.
    a. The width of the arch is 800 feet. Describe the domain of the function. Explain.
    b. Use a graphing calculator to graph the function, using the domain in part (a). Find the height of the arch.
11. Is the y-intercept of the graph of $y = ax^2$ always 0? Explain.

In Exercises 12–15, determine whether the statement is *always*, *sometimes*, or *never* true. Explain your reasoning.

12. The graph of $f(x) = ax^2$ is narrower than the graph of $g(x) = dx^2$ when $d = -a$.
13. The graph of $f(x) = ax^2$ opens in the same direction as the graph of $g(x) = dx^2$ when $d = |a|$.
14. The graph of $f(x) = ax^2$ opens in the same direction as the graph of $g(x) = dx^2$ when $g(x) = f(-x)$.
15. The graph of $f(x) = ax^2$ opens in the same direction as the graph of $g(x) = dx^2$ when $g(x) = -f(x)$.

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8.2 Practice A

In Exercises 1–3, graph the function. Compare the graph to the graph of $f(x) = x^2$.

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

2. $h(x) = x^2 + 7$

3. $k(x) = x^2 - 2$

In Exercises 4–6, graph the function. Compare the graph to the graph of $f(x) = x^2$.

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

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

6. $j(x) = 3x^2 - 2$

In Exercises 7 and 8, describe the transformation from the graph of *f* to the graph of *g*. Then graph *f* and *g* in the same coordinate plane. Write an equation that represents *g* in terms of *x*.

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

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

In Exercises 9–12, find the zeros of the function.

9. $y = x^2 - 4$

10. $y = x^2 - 64$

11. $f(x) = -x^2 + 16$

12. $f(x) = 2x^2 - 50$

13. You drop a stick from a height of 64 feet. At the same time, your friend drops a stick from a height of 144 feet.

a. After how many seconds does your stick hit the ground?

b. How many seconds later does your friend's stick hit the ground?

In Exercises 14–17, sketch a parabola with the given characteristics.

14. The parabola opens down and the vertex is $(0, 2)$.

15. The vertex is $(0, -4)$ and one of the x-intercepts is 3.

16. The related function is decreasing when $x < 0$ and the zeros are -2 and 2.

17. The lowest point on the parabola is $(0, -1)$.

18. Your friend claims that in the equation $y = ax^2 + c$, the vertex changes when the value of c changes. Is your friend correct? Explain your reasoning.

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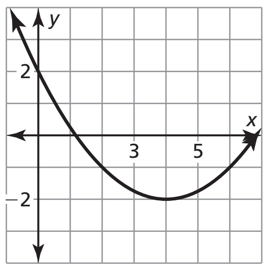
8.3 Practice A

In Exercises 1 and 2, find the vertex, the axis of symmetry, and the *y*-intercept of the graph.

1.



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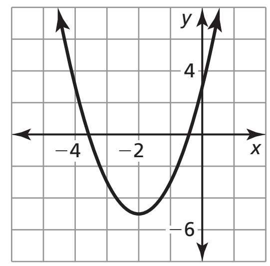

In Exercises 3–6, find (a) the axis of symmetry and (b) the vertex of the graph of the function.

3. $f(x) = 3x^2 - 6x$

4. $y = 5x^2 + 3x$

5. $y = -7x^2 + 14x + 1$

6. $f(x) = -4x^2 + 20x + 15$

In Exercises 7–10, graph the function. Describe the domain and range.

7. $f(x) = 3x^2 - 12x + 6$

8. $y = 5x^2 + 20x - 9$

9. $y = -6x^2 - 12x - 5$

10. $f(x) = -7x^2 + 28x - 8$

11. Describe and correct the error in finding the axis of symmetry of the graph of $y = -2x^2 + 16x + 7$.

> ✗ $x = -\frac{b}{2a} = -\frac{16}{2(2)} = -4$

In Exercises 12 and 13, tell whether the function has a minimum value or a maximum value. Then find the value.

12. $f(x) = 5x^2 - 20x + 3$

13. $y = -3x^2 + 12x - 7$

14. The vertex of a parabola is $(2, -2)$. Another point on the parabola is $(5, 7)$. Find another point on the parabola. Justify your answer.

In Exercises 15 and 16, use the *minimum* or *maximum* feature of a graphing calculator to approximate the vertex of the graph of the function.

15. $y = 0.2x^2 + \sqrt{6}x - 5$

16. $y = -5.3x^2 + 3.6x + 2$

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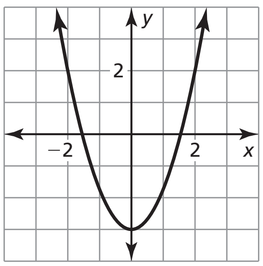
8.4 Practice A

In Exercises 1–3, determine whether the function is *even*, *odd*, or *neither*.

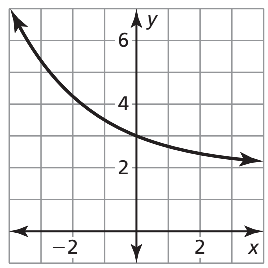
1. $g(x) = 4^x - 1$ **2.** $f(x) = 2x - 5$ **3.** $h(x) = 2x^2 + 5$

In Exercises 4 and 5, determine whether the function represented by the graph is *even*, *odd*, or *neither*.

4.



5.



In Exercises 6–8, find the vertex and the axis of symmetry of the graph of the function.

6. $f(x) = 4(x + 2)^2$ **7.** $f(x) = \frac{1}{3}(x - 3)^2$ **8.** $y = -5(x + 7)^2$

In Exercises 9–11, graph the function. Compare the graph to the graph of $f(x) = x^2$.

9. $g(x) = 2(x + 1)^2$ **10.** $g(x) = 3(x - 2)^2$ **11.** $g(x) = \frac{1}{4}(x + 6)^2$

In Exercises 12–14, find the vertex and the axis of symmetry of the graph of the function.

12. $y = -5(x + 3)^2 - 2$ **13.** $f(x) = 2(x - 2)^2 + 5$ **14.** $y = -3(x + 5)^2 - 4$

In Exercises 15 and 16, graph the function. Compare the graph to the graph of $f(x) = x^2$.

15. $g(x) = (x - 3)^2 + 2$ **16.** $g(x) = -(x + 2)^2 - 4$

In Exercises 17 and 18, rewrite the quadratic function in vertex form.

17. $y = 2x^2 + 4x - 1$ **18.** $f(x) = 3x^2 - 12x + 4$

19. The graph of $y = x^2$ is translated 4 units left and 3 units down. Write an equation for the function in vertex form and in standard form. Describe advantages of writing the function in each form.

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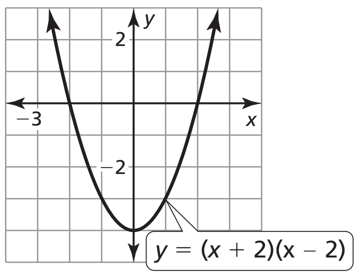
8.5 Practice A

In Exercises 1 and 2, find the *x*-intercepts and axis of symmetry of the graph of the function.

1.



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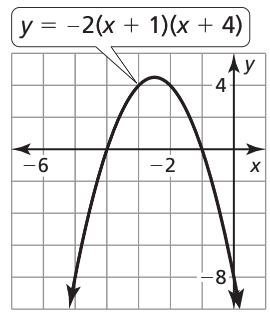

In Exercises 3–6, graph the quadratic function. Label the vertex, axis of symmetry, and *x*-intercepts. Describe the domain and range of the function.

3. $f(x) = (x + 3)(x - 1)$

4. $y = -(x - 5)(x + 1)$

5. $f(x) = 2x^2 - 16x$

6. $y = x^2 + 8x + 7$

In Exercises 7–10, find the zero(s) of the function.

7. $y = -4(x - 5)(x - 9)$

8. $f(x) = \frac{1}{4}(x + 3)(x - 2)$

9. $g(x) = x^2 - 7x - 30$

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

In Exercises 11–14, use zeros to graph the function.

11. $y = (x + 1)(x - 3)$

12. $f(x) = -2(x + 2)(x + 6)$

13. $g(x) = x^2 - 10x + 21$

14. $y = x^2 - x - 6$

In Exercises 15–19, write a quadratic function in standard form whose graph satisfies the given conditions.

15. vertex: $(-5, 4)$

16. x-intercepts: 2 and 7

17. passes through $(-3, 0)$, $(1, 0)$, and $(-1, 8)$

18. axis of symmetry: $x = -3$

19. passes through: $(-4, 0)$ and $(4, 0)$

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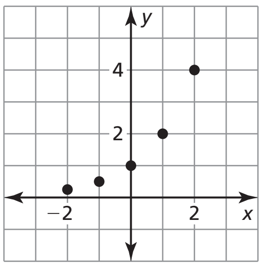
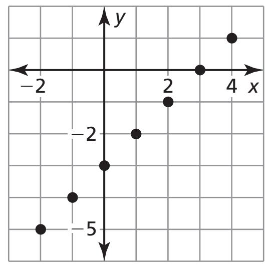
8.6 Practice A

In Exercises 1 and 2, tell whether the points appear to represent a *linear*, an *exponential*, or a *quadratic* function.

1.



2.



In Exercises 3–6, plot the points. Tell whether the points appear to represent a *linear*, an *exponential*, or a *quadratic* function.

3. $(-3, 4), (-2, 1), (-1, 0), (0, 1), (1, 4)$

4. $(-4, 0), (-2, 1), (0, 2), (2, 3), (4, 4)$

5. $(-3, -6), (-2, -1), (-1, 2), (0, 3), (1, 2)$

6. $\left(-2, \frac{1}{9}\right), \left(-1, \frac{1}{3}\right), (0, 1), (1, 3), (2, 9)$

7. The table shows the demand for a certain commodity (measured in thousands), where x is the number of the month of the year.

Number of month, *x*	1	2	3	4	5	6
Demand, *y*	5	2	1	2	5	10

a. During what month is the demand at a minimum?

b. Plot the points. Let x be the independent variable. Then determine the type of function that best represents this situation.

c. Write a function in standard form that models the data.

d. Use the function from part (c) to find the demand for the commodity (measured in thousands) during August.