LESSON 2.10

Exercise Set A

MM1A1b Graph the basic functions $f(x) = x^n$, where $n = 1$ to 3, $f(x) = \sqrt{x}$, $f(x) = |x|$, and $f(x) = \frac{1}{x}$.

MM1A1c Graph transformations of basic functions including vertical shifts, stretches, and shrinks, as well as reflections across the x- and y-axes.

MM1A1e Relate to a given context the characteristics of a function, and use graphs and tables to investigate its behavior.

Use the quadratic function to complete the table of values.

1. $y = 9x^2$

x	−2	−1	0	1	2
y	?	?	?	?	?

2. $y = -5x^2$

x	−2	−1	0	1	2
y	?	?	?	?	?

3. $y = \frac{5}{2}x^2 + 1$

x	−4	−2	0	2	4
y	?	?	?	?	?

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

x	−16	−8	0	8	16
y	?	?	?	?	?

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

x	−2	−1	0	1	2
y	?	?	?	?	?

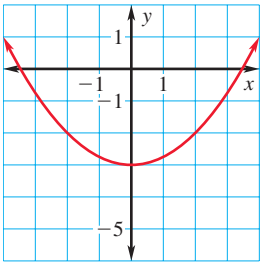
6. $y = 6x^2 - 5$

x	−2	−1	0	1	2
y	?	?	?	?	?

Match the function with its graph.

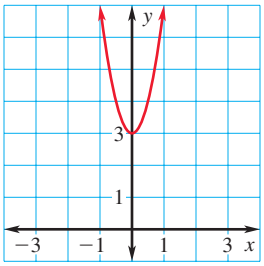
7. $y = -4x^2 + 3$

A.



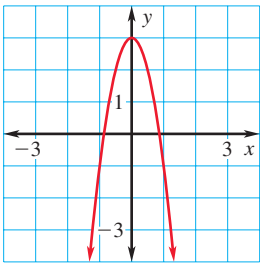
8. $y = \frac{1}{4}x^2 - 3$

B.



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

C.



Describe **how you can use the graph of $y = x^2$ to graph the given function.**

10. $y = x^2 - 8$

11. $y = -x^2 + 4$

12. $y = 2x^2 + 3$

13. $y = -5x^2 + 1$

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

15. $y = -\frac{3}{4}x^2 + 5$

LESSON 2.10

Exercise Set B

MM1A1b Graph the basic functions $f(x) = x^n$, where $n = 1$ to 3, $f(x) = \sqrt{x}$, $f(x) = |x|$, and $f(x) = \frac{1}{x}$.

MM1A1c Graph transformations of basic functions including vertical shifts, stretches, and shrinks, as well as reflections across the x- and y-axes.

MM1A1e Relate to a given context the characteristics of a function, and use graphs and tables to investigate its behavior.

Use the quadratic function to complete the table of values.

1. $y = 10x^2 - 4$

x	-2	-1	0	1	2
y	?	?	?	?	?

2. $y = -1.5x^2 + 3$

x	-2	-1	0	1	2
y	?	?	?	?	?

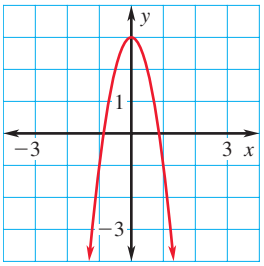
Match the function with its graph.

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

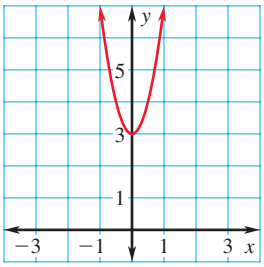
4. $y = \frac{1}{4}x^2 - 3$

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

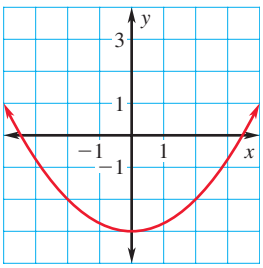
A.



B.



C.



Graph the function and identify its domain and range. *Compare* the graph with the graph of $y = x^2$.

6. $y = \frac{1}{6}x^2 + 2$

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

8. $y = 9x^2 - \frac{7}{2}$

9. $y = \frac{3}{5}x^2 + \frac{1}{5}$

10. $y = -\frac{1}{2}x^2 + 4$

11. $y = 6x^2 + \frac{3}{4}$

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

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

14. $y = -5x^2 + 15$

15. $y = 4x^2 - 9$

16. $y = -\frac{3}{4}x^2 + 7$

17. $y = 5x^2 + \frac{1}{3}$

UNIT 2

Exercise Set B *(continued)*

Tell how you can obtain the graph of *g* from the graph of *f* by using transformations.

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

19. $f(x) = 2x^2 + 14$
$g(x) = 2x^2 + 9$

20. $f(x) = -\frac{1}{2}x^2 - 3$
$g(x) = -\frac{1}{2}x^2 - 7$

21. $f(x) = 3x^2 - 5$
$g(x) = 3x^2 + 11$

22. $f(x) = 3x^2$
$g(x) = 9x^2$

23. $f(x) = 8x^2$
$g(x) = 4x^2$

Write a function of the form $y = ax^2 + c$ whose graph passes through the two given points. Then graph the function.

24. (0, 6), (2, 10)

25. (0, 1), (−1, 0)

26. (0, −4), (−3, 5)

27. **Nylon Rope** The breaking weight w (in pounds) of a nylon rope can be modeled by the function $w = 22{,}210d^2$ where d is the diameter (in inches) of the rope.

a. Graph the function.

b. Use the graph to estimate the diameter of a nylon rope that has a breaking weight of 50,000 pounds.

28. **Multiple Representations** Two acorns drop from an oak tree. Acorn A falls 45 feet, while acorn B falls 32 feet.

a. **Writing an Equation** For each acorn, write an equation that gives the height h (in feet) of the acorn as a function of the time t (in seconds) it has fallen.

b. **Making a Table** Complete the table for each equation from part (a). Estimate how long it takes each acorn to hit the ground.

Time, *t*	0	0.4	0.8	1.2	1.4	1.8
Height, *h*	?	?	?	?	?	?

c. **Drawing a Graph** Graph each equation from part (a). *Describe* how the graphs of the two equations are related.

29. **Foam Ball** A foam ball is dropped from a deck that is 20 feet above the ground.

a. The distance y (in feet) that the ball falls is given by the function $y = 16t^2$ where t is the time (in seconds) since the ball was dropped. Graph the function.

b. The height y (in feet) of the dropped ball is given by the function $y = -16t^2 + 20$ where t is the time (in seconds) since the ball was dropped. Graph the function.

c. How are the graphs from part (a) and part (b) related? *Explain* how you can use each graph to find the number of seconds after which the ball has dropped 8 feet.