Practice A
For use with pages 122–128

Match the function with its graph.

1. \( f(x) = |x + 4| \)
2. \( f(x) = |x - 4| \)
3. \( f(x) = |x| + 4 \)
4. \( f(x) = |x| - 4 \)
5. \( f(x) = 4|x| \)
6. \( f(x) = \frac{1}{4}|x| \)

A.

B.

C.

D.

E.

F.

Tell whether the graph of the function opens up or down.

7. \( y = -3|x| \)
8. \( y = 3|x + 1| \)
9. \( y = |x + 1| - 10 \)
10. \( y = 4|x - 1| + 3 \)
11. \( y = -2|x + 1| + 7 \)
12. \( y = -|x - 2| + 4 \)

Identify the vertex of the graph of the given function.

13. \( y = 2|x| - 3 \)
14. \( y = |x - 1| + 2 \)
15. \( y = |x + 3| - 5 \)
16. \( y = |x - 7| - 2 \)
17. \( y = 2|x + 1| + 9 \)
18. \( y = -5|x + 3| \)

Tell whether the graph of the function is wider, narrower, or the same width as the graph of \( y = |x| \).

19. \( y = |x - 8| \)
20. \( y = 2|x - 1| \)
21. \( y = \frac{1}{2}|x + 3| - 2 \)
22. \( y = -3|x + 1| + 7 \)
23. \( y = -\frac{2}{3}|x - 6| + 3 \)
24. \( y = \frac{9}{10}|x| + 13 \)

Swimwear  In Exercises 25 and 26, use the following information.
A sporting goods store sells swimming suits year round. The number of suits sold can be modeled by the function \( S = -90|t - 6| + 540 \), where \( t \) is the time in months and \( S \) is the sales in dollars.

25. Graph the function for \( 0 \leq t \leq 12 \).
26. What is the maximum sales in one month? In what month is the maximum reached?
Tell whether the graph of the function opens up or down.

1. \( y = |x + 3| - 5 \)  
2. \( y = -4|x - 1| + 6 \)  
3. \( y = \frac{2}{3}|x - 2| + 9 \)

Identify the vertex of the graph of the given function.

4. \( y = 2|x + 13| - 6 \)  
5. \( y = -3|x - 4| - 7 \)  
6. \( y = \frac{1}{5}|x + 2| + 11 \)

Tell whether the graph is wider, narrower, or the same width as the graph of \( y = |x| \).

7. \( y = \frac{3}{5}|x - 3| + 7 \)  
8. \( y = -8|x + 9| - 12 \)  
9. \( y = -\frac{5}{2}|x - 1| - 3 \)

Graph the function.

10. \( y = |x| - 4 \)  
11. \( y = |x - 4| \)  
12. \( y = |x + 2| - 3 \)  
13. \( y = |x + 1| + 3 \)  
14. \( y = 2|x - 3| \)  
15. \( y = -|x + 5| \)  
16. \( y = |x - 4| + 5 \)  
17. \( y = 3|x - 1| - 2 \)  
18. \( y = -2|x + 7| - 4 \)  
19. \( y = \frac{1}{2}|x| - 2 \)  
20. \( y = \frac{2}{3}|x + 2| + 1 \)  
21. \( y = -\frac{1}{2}|x - 1| + 2 \)

Write an equation of the graph shown.

22.  
23.  
24.  

A-Frame Home  In Exercises 25 and 26, use the following information.
The roof line of an A-frame home follows the path given by \( y = -\frac{11}{6}|x| + 22 \). Each unit on the coordinate plane represents one foot.

25. Find the vertex of the graph.
26. What does the y-value of the vertex tell us about the home?

Fine Dining  In Exercises 27 and 28, use the following information.
An exclusive restaurant is open from 3:00 P.M. to 10:00 P.M. Each evening, the number of people served \( S \) increases steadily and then decreases according to the model \( S = -30|t - 6.5| + 105 \) where \( t = 0 \) represents 12:00 P.M.

27. Graph the function.
28. Find the vertex of the graph. Explain what each coordinate of the vertex represents.