Math 100 Review 5

Use the square root property to solve the equation.

1) $x^2 = 36$

2) $x^2 - 22 = 0$

3) $x^2 + 36 = 0$

4) $2x^2 = 30$

5) $(x + 4)^2 = 17$

6) $(2x - 3)^2 = 81$

7) $(x + 4)^2 = -50$

Solve the equation by completing the square.

8) $x^2 - 14x + 13 = 0$

9) $x^2 + 12x + 23 = 0$

10) $x^2 + 3 = -10x$

11) $x^2 + 4x + 40 = 0$

12) $16x^2 - 3x + 1 = 0$

Solve.

13) The area of a square porch is 49 square feet. Find the dimensions of the porch.

14) An isosceles right triangle has legs of equal length. If the hypotenuse is 16 inches long, find the length of each leg.

Use the quadratic formula to solve the equation.

15) $x^2 + 14x + 48 = 0$

16) $5x^2 - 4x - 9 = 0$

17) $2x^2 + 6x = -3$

18) $2x^2 = -10x - 5$

19) $-8x^2 + 5x - 2 = 0$

20) $4x^2 + 1 = 3x$

Use the discriminant to determine the number and type of solutions of the equation.

21) $x^2 - 6x - 7 = 0$

22) $4x^2 - 8x + 4 = 0$

23) $x^2 + 3x + 6 = 0$

Solve.

24) $x = \sqrt{3x + 28}$

25) $x - \sqrt{9x} = 1$

26) $\frac{10}{x^2} = \frac{5}{x + 8}$

27) $\frac{2}{x} + \frac{7}{x - 9} = 1$

28) $x^4 - 16 = 0$

29) $x^{2/3} + 2x^{1/3} - 8 = 0$

30) $x^3 + x + 5x^2 + 5 = 0$

31) $x^{-2} - x^{-1} - 110 = 0$

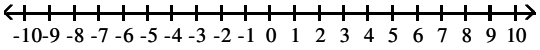
32) $(3x - 6)^2 - 3(3x - 6) = 4$

33) Shelly can cut a lawn with a riding mower in 2 hours less time than it takes William to cut the lawn with a push mower. If they can cut the lawn in 4 hours working together find how long to the nearest tenth of an hour it takes for William to cut the lawn alone.

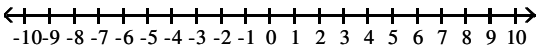
34) The product of a number and 2 less than the number is 99. Find the number.

Solve the inequality. Graph the solution set and write the solution set in interval notation.

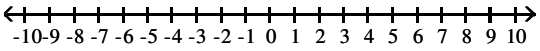
35) $(x - 3)(x - 7) > 0$



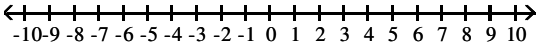
36) $(x + 6)(x + 5) \leq 0$



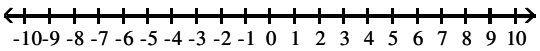
37) $x^2 + 3x - 28 \geq 0$



38) $x^2 - 3x \geq 4$



39) $(x^2 - 49)(x^2 - 4) > 0$

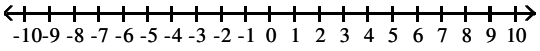


Find all numbers that satisfy the following.

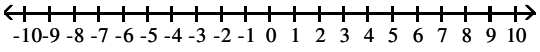
40) The sum of 9 times a number and the reciprocal of the number is positive. Find the numbers.

Solve the inequality. Graph the solution set and write the solution set in interval notation.

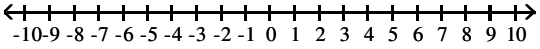
41) $\dfrac{x - 1}{x + 2} < 0$



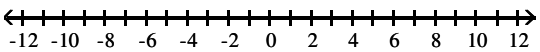
42) $\dfrac{6}{6x - 7} > 0$



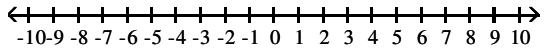
43) $\dfrac{2}{x - 5} < 1$



44) $\dfrac{(x - 3)^2}{x^2 - 25} > 0$

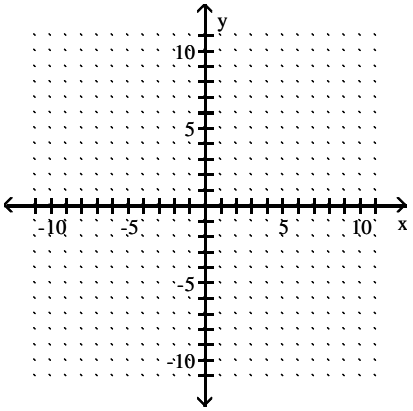


45) $\frac{5x}{x+7} < x$

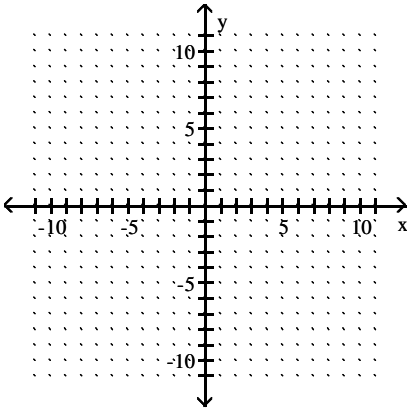


Sketch the graph of the quadratic function. Give the vertex and axis of symmetry.

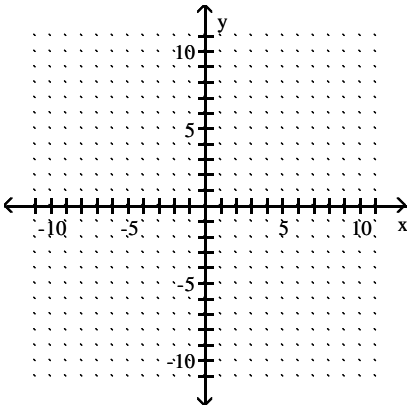
46) $f(x) = x^2 - 2$



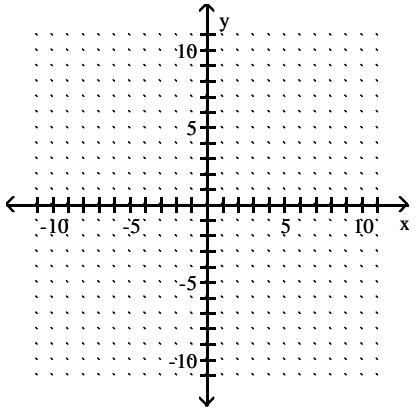
47) $f(x) = x^2 + 3$



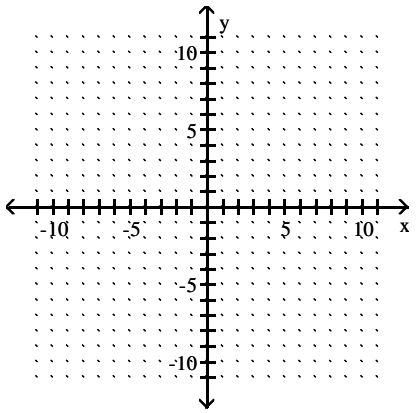
48) $f(x) = (x - 6)^2$



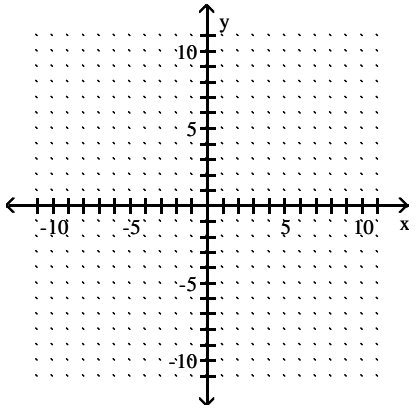
49) $f(x) = (x + 4)^2$



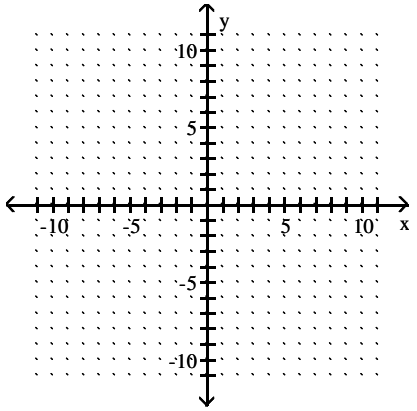
50) $f(x) = (x - 4)^2 + 5$



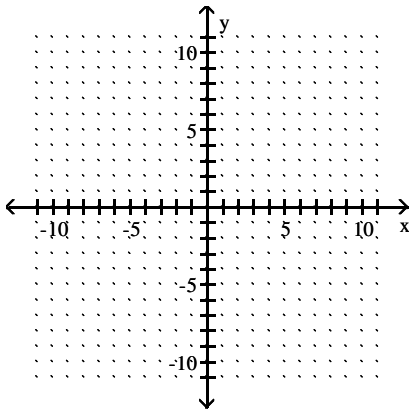
51) $f(x) = (x - 6)^2 + 4$



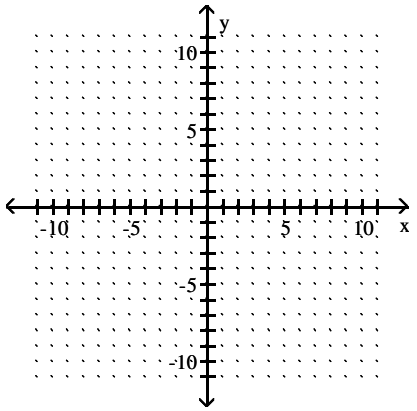
52) $f(x) = -5x^2$



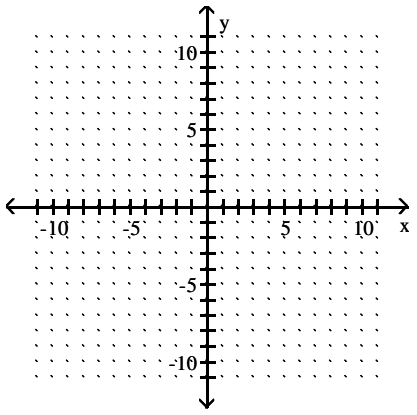
53) $f(x) = -2x^2$



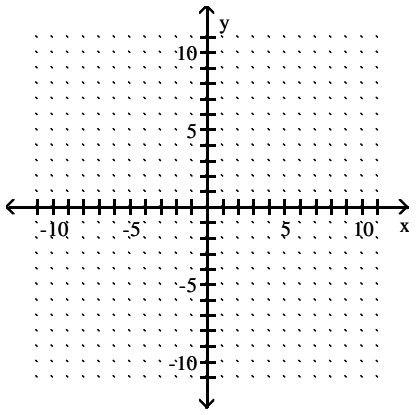
54) $f(x) = \frac{1}{4}x^2$



55) $f(x) = -x^2 - 2$

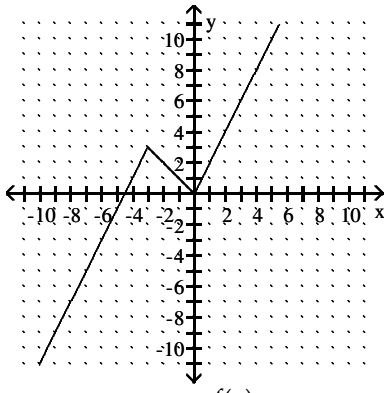


56) $f(x) = 2x^2 - 2$

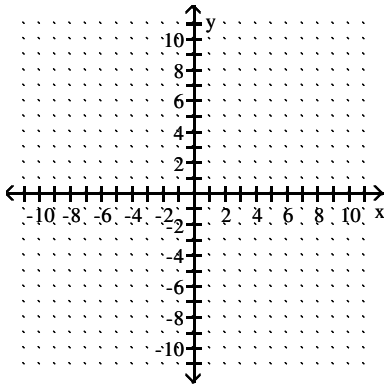


Given the accompanying graph of y = f(x), sketch the graph of the following.

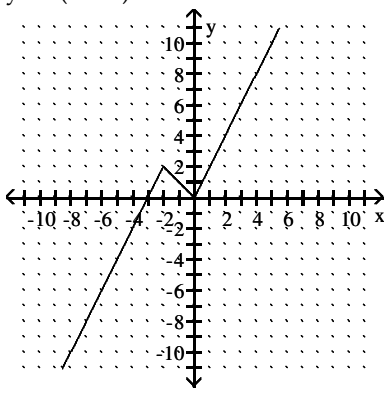
57) $y = f(x) - 4$



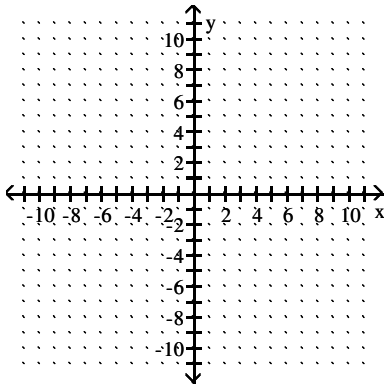
y = f(x)



58) $y = f(x + 1)$



$y = f(x)$



Write the function in the form $y = a(x - h)^2 + k$.

59) $f(x) = x^2 + 6x - 2$

60) $f(x) = -x^2 + x - 8$

Find the vertex of the graph of the quadratic function.

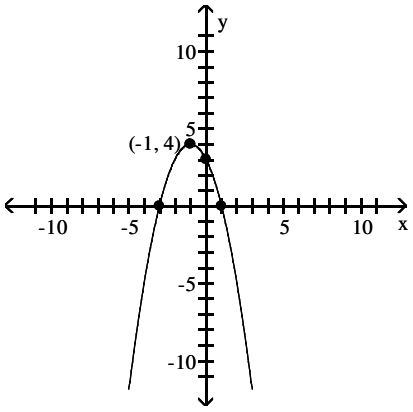
61) $f(x) = x^2 + 10x + 4$

62) $f(x) = -x^2 - 6x + 6$

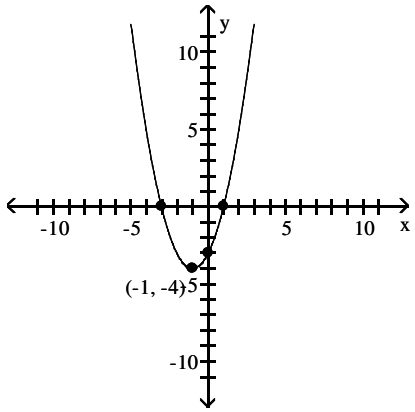
Match the function with its graph.

63) $f(x) = x^2 - 2x - 3$

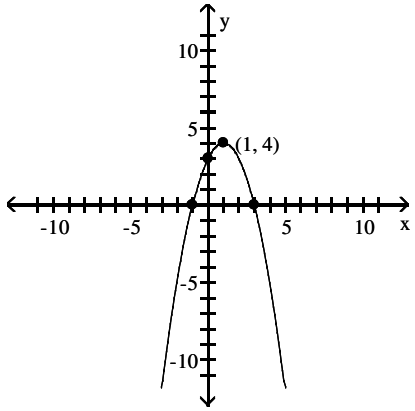
A)



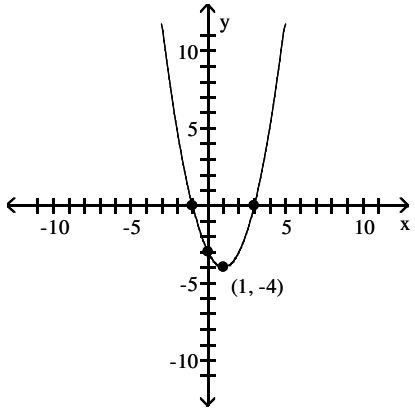
B)



C)

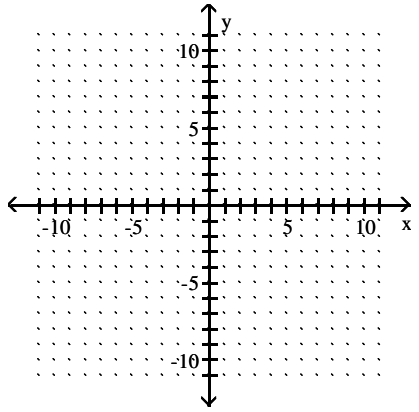


D)

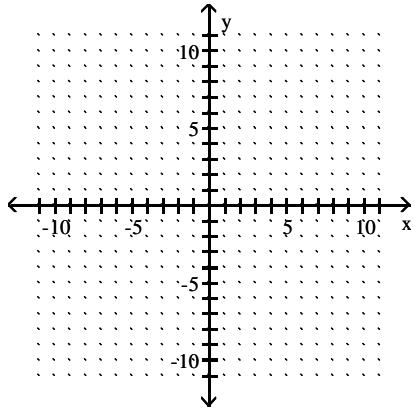


Sketch the graph of the quadratic function by finding the vertex, intercepts, and determining if the graph opens upward or downward.

64) $f(x) = x^2 + 4$



65) $f(x) = x^2 + 4x - 5$

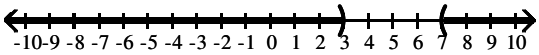


Solve.

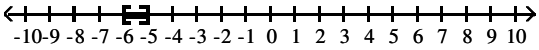
66) Find two numbers whose sum is 66 and whose product is as large as possible. [Hint: Let x and 66 – x be the two numbers.Their product can be described by the function f(x) = x(66 – x).]

1) $-6, 6$
2) $-\sqrt{22}, \sqrt{22}$
3) $-6i, 6i$
4) $-\sqrt{15}, \sqrt{15}$
5) $-4 - \sqrt{17}, -4 + \sqrt{17}$
6) $6, -3$
7) $-4 - 5i\sqrt{2}, -4 + 5i\sqrt{2}$
8) $13, 1$
9) $-6 - \sqrt{13}, -6 + \sqrt{13}$
10) $-5 - \sqrt{22}, -5 + \sqrt{22}$
11) $-2 - 6i, -2 + 6i$
12) $\frac{3 - i\sqrt{55}}{32}, \frac{3 + i\sqrt{55}}{32}$
13) 7 feet by 7 feet
14) $8\sqrt{2}$ in.
15) $-8, -6$
16) $\frac{9}{5}, -1$
17) $\frac{-3 - \sqrt{3}}{2}, \frac{-3 + \sqrt{3}}{2}$
18) $\frac{-5 - \sqrt{15}}{2}, \frac{-5 + \sqrt{15}}{2}$
19) $\frac{-5 - i\sqrt{39}}{-16}, \frac{-5 + i\sqrt{39}}{-16}$
20) $\frac{3 - i\sqrt{7}}{8}, \frac{3 + i\sqrt{7}}{8}$
21) two real solutions
22) one real solution
23) two complex but not real solutions
24) 7
25) $\frac{11 + 3\sqrt{13}}{2}$
26) $1 - \sqrt{17}, 1 + \sqrt{17}$
27) $9 - 3\sqrt{7}, 9 + 3\sqrt{7}$
28) $-2, 2, -2i, 2i$
29) $-64, 8$
30) $-5, -i, i$
31) $\frac{1}{11}, -\frac{1}{10}$
32) $\frac{10}{3}, \frac{5}{3}$
33) 9.1 hours
34) -9 or 11

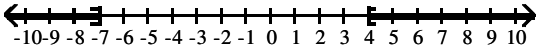
35) $(-\infty, 3) \cup (7, \infty)$



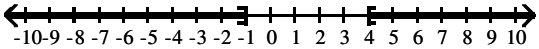
36) $[-6, -5]$



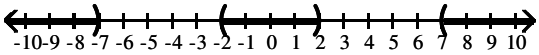
37) $(-\infty, -7] \cup [4, \infty)$



38) $(-\infty, -1] \cup [4, \infty)$

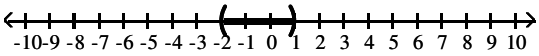


39) $(-\infty, -7) \cup (-2, 2) \cup (7, \infty)$

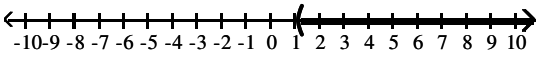


40) any number greater than 0

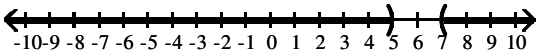
41) $(-2, 1)$



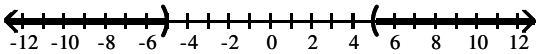
42) $\left[\frac{7}{6}, \infty\right)$



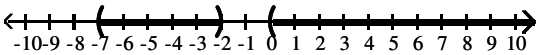
43) $(-\infty, 5) \cup (7, \infty)$



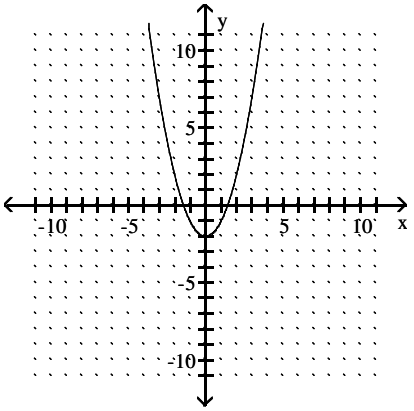
44) $(-\infty, -5) \cup (5, \infty)$



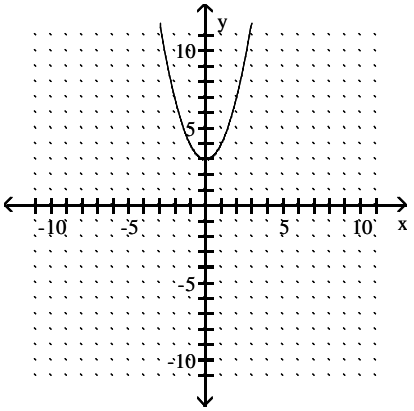
45) $(-7, -2) \cup (0, \infty)$



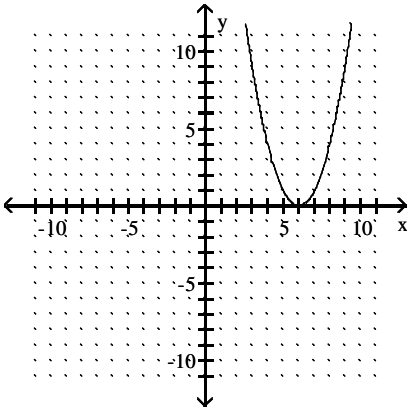
46) vertex (0, –2); axis x = 0



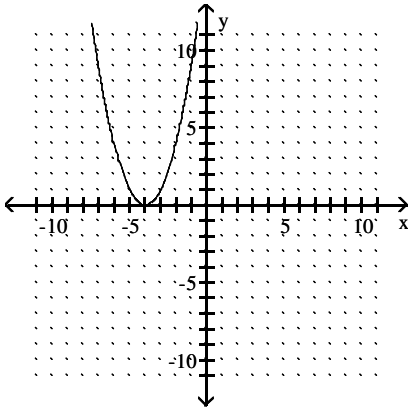
47) vertex (0, 3); axis x = 0



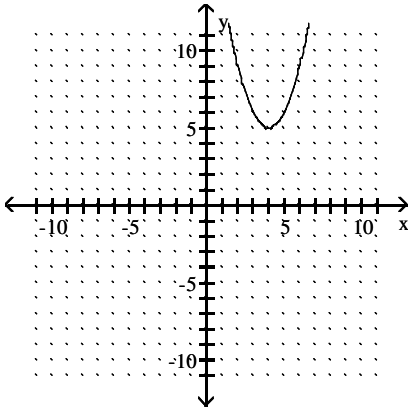
48) vertex (6, 0); axis x = 6



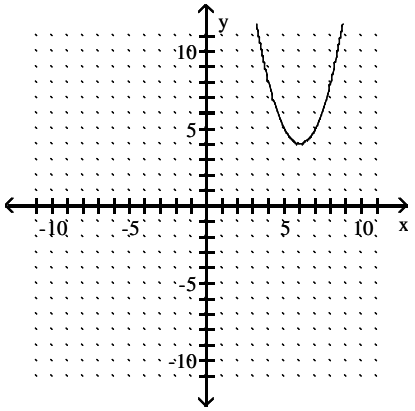
49) vertex (−4, 0); axis x = −4



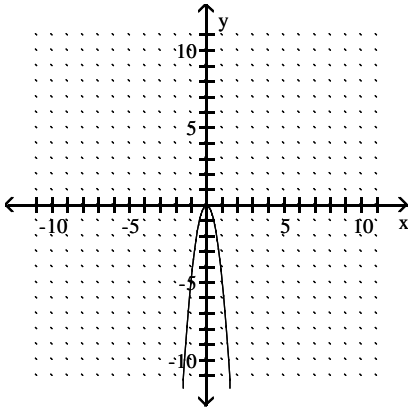
50) vertex (4, 5); axis x = 4



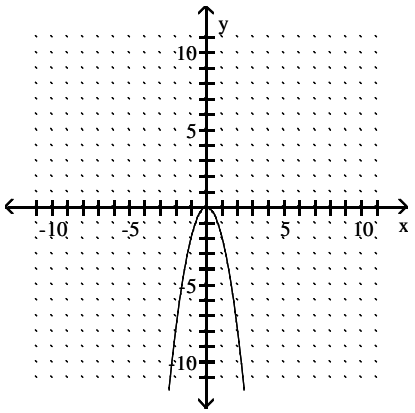
51) vertex (6, 4); axis x = 6



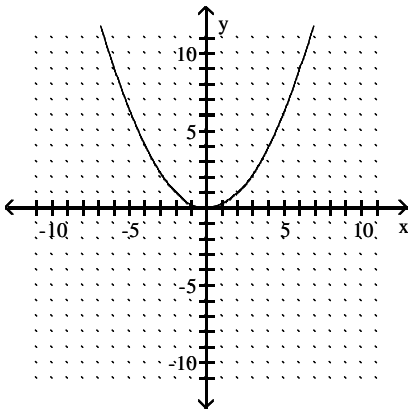
52) vertex (0, 0); axis x = 0



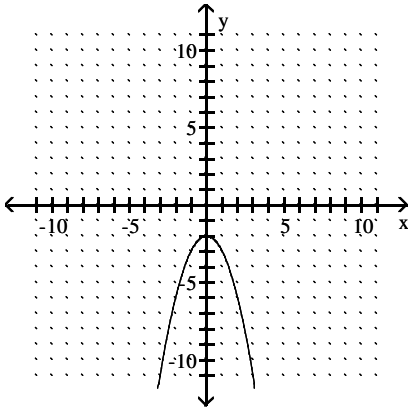
53) vertex (0, 0); axis x = 0



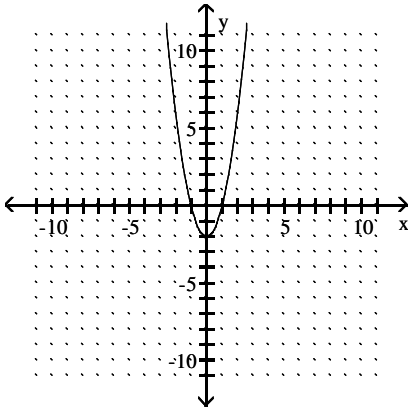
54) vertex (0, 0); axis x = 0



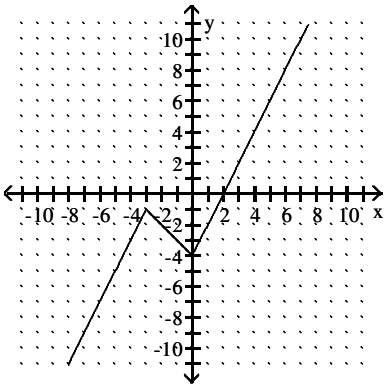
55) vertex (0, –2); axis x = 0



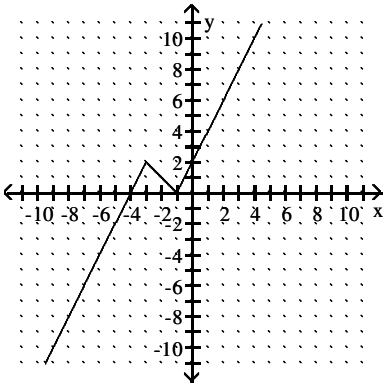
56) vertex (0, –2); axis x = 0



57)



58)



59) $y = (x + 3)^2 - 11$

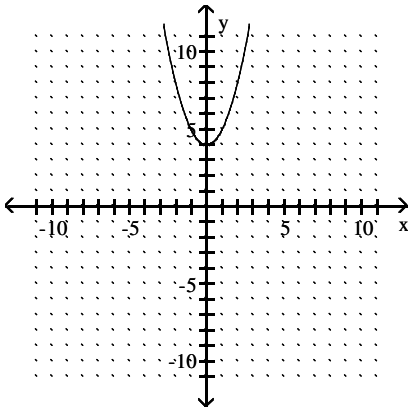
60) $y = -\left(x - \frac{1}{2}\right)^2 - \frac{31}{4}$

61) (–5, –21)

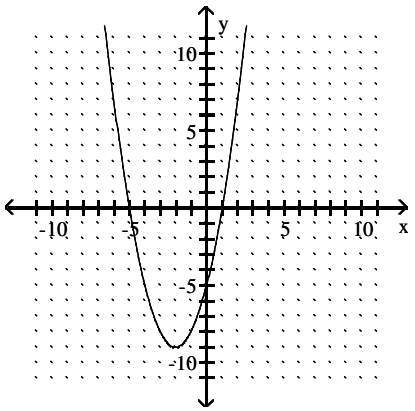
62) (–3, 15)

63) D

64)



65)



66) 33 and 33