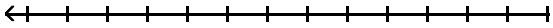
Solve the absolute value equation.

1) $|4m + 2| = 8$

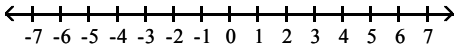
2) $2|x + 7| - 7 = 1$

Solve the inequality. Write the solution set using interval notation and graph it.

3) $6x - 11 \geq 7x - 23$



4) $14 < -4b + 2 \leq 30$



Solve the absolute value inequality. Write the solution set using interval notation.

5) $|7x - 6| \geq 4$

6) $2|x - 3| < 4$

Find the distance between the points, and find the midpoint of the line segment joining them.

7) (-8, 2) and (-9, -5)

Find the center and radius of the circle.

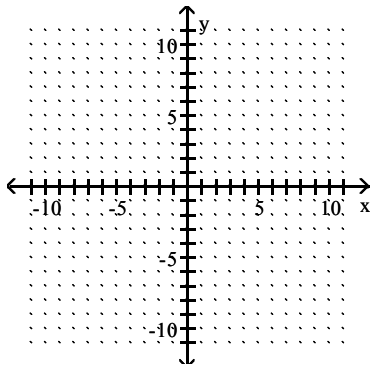
8) $(x + 5)^2 + (y - 1)^2 = 144$

Write the standard equation for the circle.

9) Center at (-8, -4), radius $\sqrt{17}$

Graph the equation.

10) $x^2 + y^2 + 6x + 4y + 9 = 0$



Find the equation of the line through the given pair of points. Solve it for y if possible.

11) (3, -8), (5, 2)

Change the equation to slope-intercept form and identify the slope and y-intercept.

12) $-6x + 9y = 10$

Write an equation in standard form using only integers for the line described.

13) The line through (4, 2), parallel to $y = -\frac{5}{7}x + 1$

14) The line through (0, 5), perpendicular to $y = \frac{5}{3}x + 2$

Solve the problem.

15) Suppose that a sales person observes that if an item is priced at $3 per item then 10 items are sold. If 8 items are sold for $5 per item then find an equation to model the number of items sold, y, as a function of dollars per item, x.

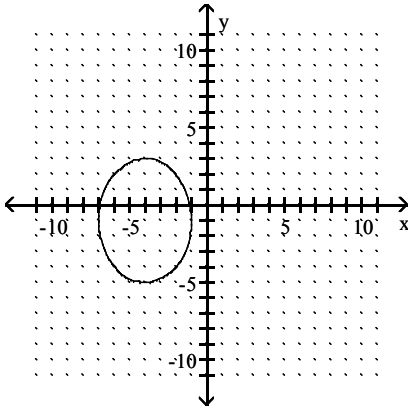
16) A driver wants to gauge the fuel efficiency of her vehicle at speeds of 30 mph and above. She notices that traveling at an average speed of 40 mph results in a rating of 25 mpg, whereas, at an average speed of 45 mph, her car rates 15 mpg. Find an equation to model the gas mileage, m, as a function of average speed s mph.

17) A car rental company has two rental rates. Rate 1 is $40 per day plus $.10 per mile. Rate 2 is $80 per day plus $.05 per mile. If you plan to rent for one day, how many miles would you need to drive to pay less by taking Rate 2?

18) Assume that the sales of a certain appliance dealer are approximated by a linear function. Suppose that sales were $5000 in 1982 and $64,000 in 1987. Let x = 0 represent 1982. Find the equation giving yearly sales S(x).

Use the vertical line test to determine whether y is a function of x.

19)



Find the domain and range.

20) $y = \sqrt{3 + x}$

21) $y = 2x^5$

22) $f(x) = 11 + x^2$

State the domain of the rational function.

23) $f(x) = \dfrac{(x - 9)(x + 2)}{x^2 - 1}$

Find the difference quotient, $\dfrac{f(x + h) - f(x)}{h}$, for the function and simplify it.

24) $f(x) = 2x - 8$

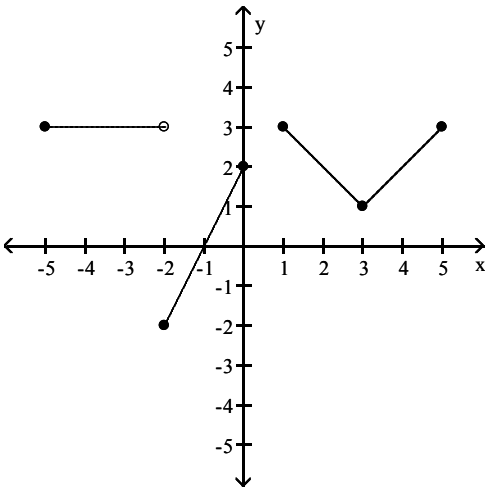
25) $f(x) = x^2 - 6x$

Solve the problem.

26) The cost of manufacturing a molded part is related to the quantity produced during a production run. When 100 parts are produced, the cost is \$300. When 600 parts are produced, the cost is \$2300. What is the average cost per part?

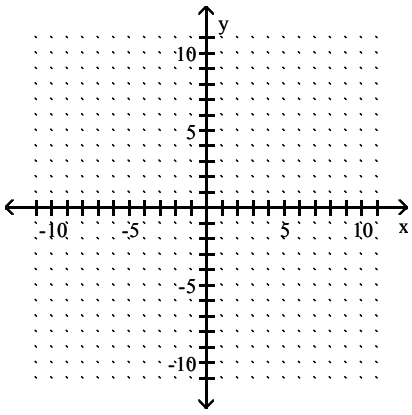
Determine the intervals on which the function is increasing, decreasing, and constant.

27)

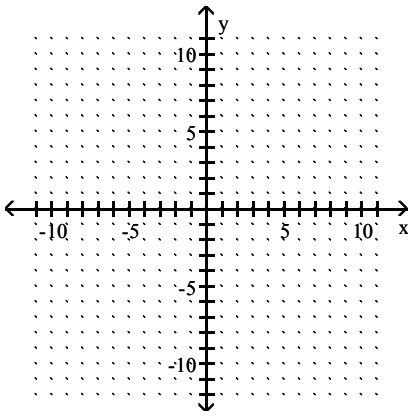


Graph the equation.

28) $y = 5|x| - 9$

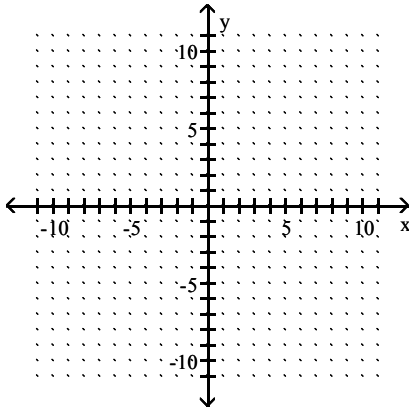


29) $y = -x^2 - 4$

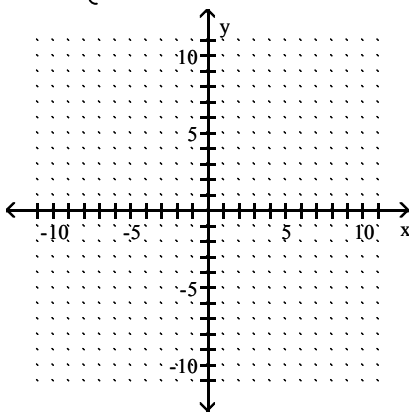


Graph.

30) $y = -2(x + 8)^2 - 3$



31) $f(x) = \begin{cases} x + 4, & \text{for } x < 0 \\ 4, & \text{for } x \geq 0 \end{cases}$



Write the equation of the graph after the indicated transformation(s).

32) The graph of $y = \sqrt[3]{x}$ is shifted 5.6 units to the left. This graph is then vertically stretched by a factor of 3.6. Finally, the graph is reflected across the x-axis.

List the symmetries of the given function, if there are any. Otherwise, state "No symmetry".

33) $f(x) = 7x^5 + 8x^3$

For the pair of functions, perform the indicated operation.

34) $f(x) = 6x - 1$, $g(x) = 7x - 3$
Find $f \cdot g$.

35) Find $(f + g)(-5)$ given $f(x) = x + 7$ and $g(x) = x - 1$.

36) Given $f(x) = 4x - 3$ and $g(x) = -8x + 6$, find $(f - g)(a)$.

37) Find $(g \circ f)(-2)$ when $f(x) = \frac{x - 4}{3}$ and $g(x) = 2x + 5$.

38) Given $f(x) = \sqrt{x + 4}$ and $g(x) = 8x - 8$, find $(f \circ g)(x)$.

Find the specified domain.

39) For $f(x) = 2x - 5$ and $g(x) = \sqrt{x + 4}$, what is the domain of f/g?

Find the inverse of the function.

40) $f(x) = 4x + 6$

41) $f(x) = x^2 - 19, x \geq 0$

Identify the vertex of the parabola.

42) $y = 8x^2 - 144x + 652$

Find the y-intercepts and any x-intercepts.

43) $y = x^2 - 4x - 21$

Solve the quadratic inequality.

44) $x^2 + 5x - 14 \geq 0$

45) $x^2 + 2x \leq 3$

Solve the problem.

46) The number of mosquitoes M(x), in millions, in a certain area depends on the June rainfall x, in inches: $M(x) = 10x - x^2$. What rainfall produces the maximum number of mosquitoes?

47) John owns a hotdog stand. He has found that his profit is represented by the equation $P = -x^2 + 78x + 86$, with P being profits and x the number of hotdogs. How many hotdogs must he sell to earn the most profit?

Perform the indicated operations and write the answer in the form a + bi, where a and b are real numbers.

48) $(7 + 6i) - (-5 + i)$

49) $(6 - 8i)(7 - 5i)$

Write the quotient in the form a + bi.

50) $\frac{9+3i}{3-7i}$

Find all real solutions to the equation.

51) $\sqrt{x+13} = x - 7$

52) $7 + \sqrt{3x} = 1 + x$

Use the rational zero theorem to find all <u>possible</u> rational zeros for the polynomial function.

53) $f(x) = 2x^3 + 6x^2 + 13x - 8$

Find all of the real and imaginary zeros for the polynomial function.

54) $f(x) = x^4 + 6x^3 + 7x^2 - 6x - 8$

Find all real and imaginary solutions.

55) $x^4 - 256 = 0$

56) $x^2 + 35 = 5x$

57) $k^4 - 13k^2 + 42 = 0$

58) $x^{2/3} - 7x^{1/3} + 10 = 0$

Solve the problem.

59) $A(x) = -0.015x^3 + 1.05x$ gives the alcohol level in an average person's blood x hrs after drinking 8 oz of 100-proof whiskey. If the level exceeds 1.5 units, a person is legally drunk. Would a person be drunk after 4 hours?

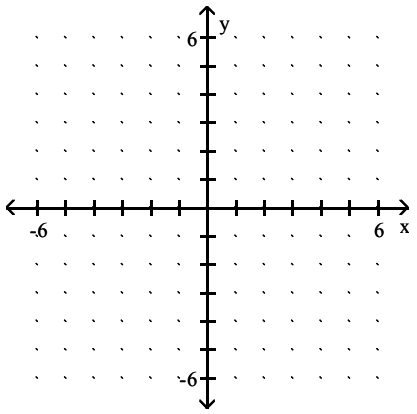
Describe the behavior of the function's graph at its x-intercepts.

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

61) $x^3 - 3x^2 - 9x + 27$

Sketch the graph of the polynomial function.

62) $P(x) = -2x(x - 2)^2$



For the given function, find all asymptotes of the type indicated (if there are any).

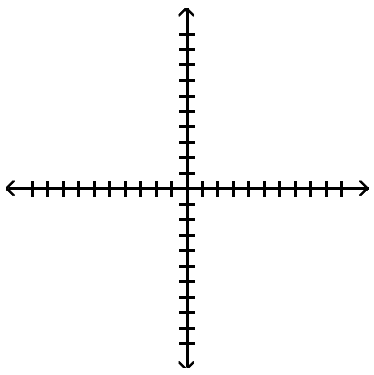
63) $f(x) = \frac{x-2}{x^2-9}$, vertical

64) $f(x) = \frac{x^2-3x+7}{x+7}$, oblique

65) $f(x) = \frac{6x^2-5x-3}{5x^2-9x+4}$, horizontal

Sketch the graph of the function, showing all asymptotes with dotted lines.

66) $f(x) = \frac{5x+1}{x-1}$

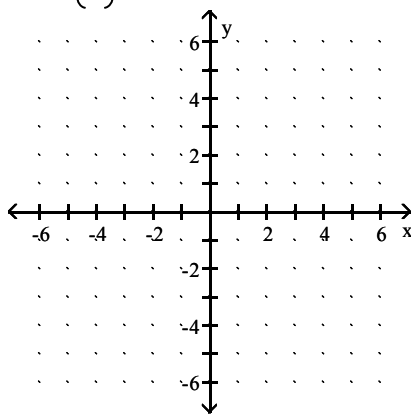


Solve the inequality.

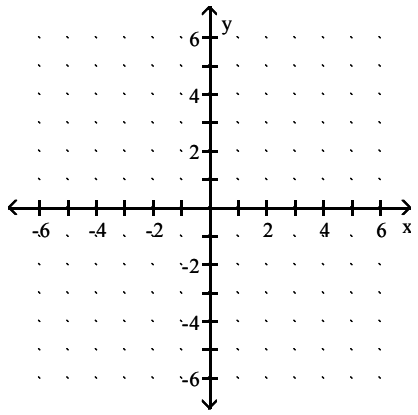
67) $\frac{4}{x+5} \geq \frac{2}{x-2}$

Use transformations to help you graph the function.

68) $f(x) = \left(\frac{1}{3}\right)^x + 2$



69) $f(x) = \log_2 (x - 1)$



Solve the equation.

70) $5^{-x} = \frac{1}{25}$

Find the value of the logarithmic function.

71) $\log_8 \left(\frac{1}{64}\right)$

72) $\ln (e^{-8})$

Find the domain of the function.

73) $f(x) = \log_2 (2x - 3)$

Solve the equation.

74) $\log_2 x = 3$

Simplify the expression.

75) $10^{\log (t)}$

Rewrite the expression as a single logarithm.

76) $6 \log_2 (6x - 1) + 4 \log_2 (5x - 4)$

Rewrite the expression as a sum or difference of logarithms or multiples of logarithms.

77) $\log_5 \left(\frac{x^4 y^7}{4}\right)$

Solve the equation. Round your solution to three decimal places.

78) $4^{3x - 3} = 12$

Solve the equation. Give an exact solution.

79) $\log(x^2 - 39) = 1$

Solve the problem.

80) If $4000 is invested in an account that pays interest compounded continuously, how long will it take to grow to $12,000 at 7%?

Solve the equation. Give an exact solution.

81) $\log_4 (x - 5) + \log_4 (x - 5) = 1$

82) $\ln(5x - 3) = \ln(9) - \ln(x - 3)$

Solve the problem.

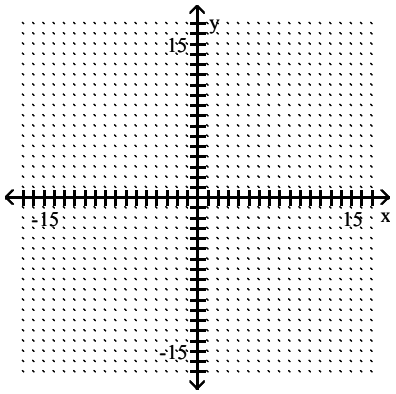
83) An initial investment of $14,000 is appreciated for 8 years in an account that earns 9% interest, compounded semiannually. Find the amount of money in the account at the end of the period.

84) A certain radioactive isotope has a half-life of approximately 1100 years. How many years to the nearest year would be required for a given amount of this isotope to decay to 30% of that amount?

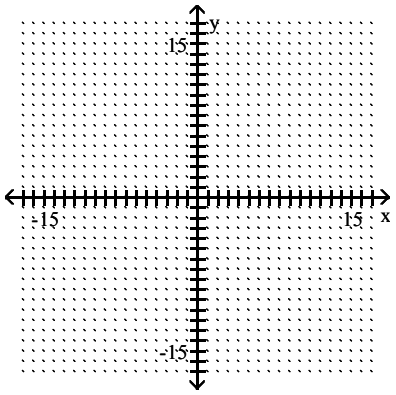
85) Coyotes are one of the few species of North American animals with an expanding range. The future population of coyotes in a region of Mississippi can be modeled by the equation $P = 45 + 20\ln(20t + 1)$, where t is time in years. Use the equation to determine when the population will reach 140. (Round to the nearest tenth of a year.)

Graph:

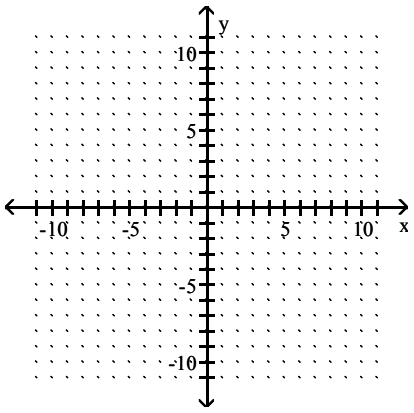
86) $\frac{x^2}{9} + \frac{y^2}{49} = 1$



87) $\frac{(x+1)^2}{9} + \frac{(y-3)^2}{25} = 1$



88) $\frac{x^2}{25} - \frac{y^2}{36} = 1$

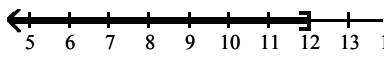


Answer Key

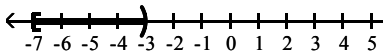
1) $\left\{\frac{3}{2}, -\frac{5}{2}\right\}$

2) $\{-3, -11\}$

3) $(-\infty, 12]$



4) $[-7, -3)$



5) $\left(-\infty, \frac{2}{7}\right] \cup \left[\frac{10}{7}, \infty\right)$

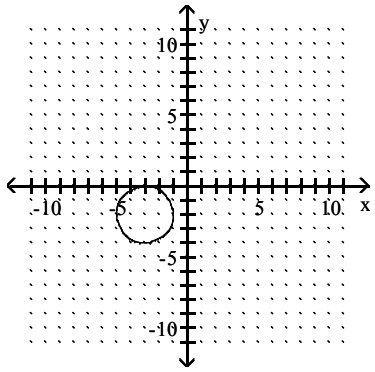
6) $(1, 5)$

7) $5\sqrt{2}; \left(-\frac{17}{2}, -\frac{3}{2}\right)$

8) Center: $(-5, 1)$; radius: 12

9) $(x+8)^2 + (y+4)^2 = 17$

10)



11) $y = 5x - 23$

12) $y = \frac{2}{3}x + \frac{10}{9}, \frac{2}{3}, \left(0, \frac{10}{9}\right)$

13) $5x + 7y = 34$

14) $3x + 5y = 25$

15) $y = -x + 13$

16) $m = -2s + 105$

17) more than 800 miles

18) $S(x) = 11{,}800x + 5000$

19) No

20) $D = [-3, \infty)$; $R = [0, \infty)$

21) $D = (-\infty, \infty)$; $R = (-\infty, \infty)$

22) $D = (-\infty, \infty)$; $R = [11, \infty)$

23) $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

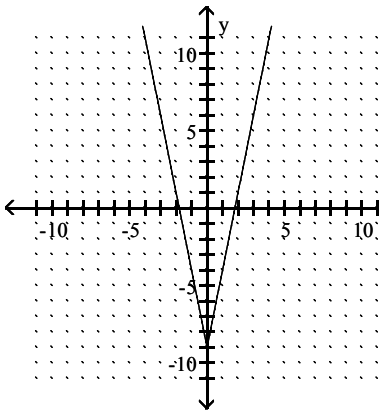
24) 2

25) $2x + h - 6$

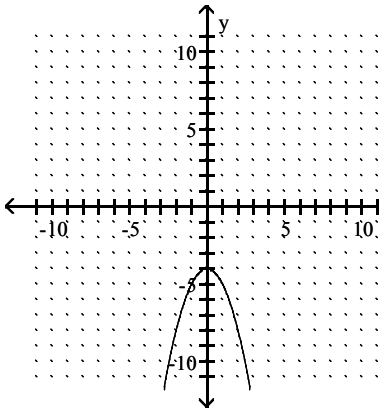
26) \$4.00 per part

27) Increasing on $(-2, 0)$ and $(3, 5)$; Decreasing on $(1, 3)$; Constant on $(-5, -2)$

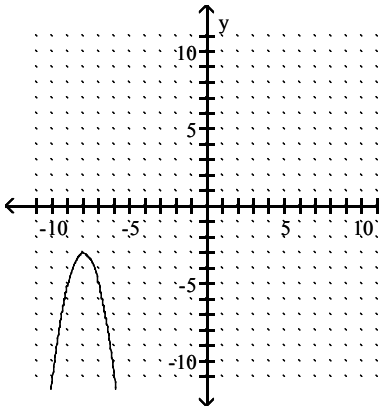
28)



29)



30)



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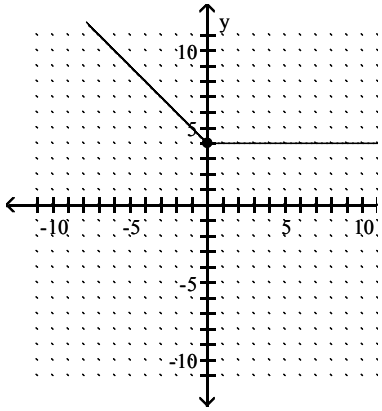


32) $f(x) = -3.6\sqrt[3]{x + 5.6}$

33) Origin

34) $(f \cdot g)(x) = 42x^2 - 25x + 3$

35) -4

36) $12a - 9$

37) 1

38) $2\sqrt{2x - 1}$

39) $(-4, \infty)$

40) $f^{-1}(x) = \frac{x - 6}{4}$

41) $f^{-1}(x) = \sqrt{x + 19}$

42) (9, 4)

43) y-intercept $(0, -21)$, x-intercepts $(7, 0)$ and $(-3, 0)$

44) $(-\infty, -7] \cup [2, \infty)$

45) $[-3, 1]$

46) 5 in.

47) 39 hotdogs

48) $12 + 5i$

49) $2 - 86i$

50) $\frac{3}{29} + \frac{36}{29}i$

51) {12}

52) {12}

53) $\pm\left(1, \frac{1}{2}, 2, 4, 8\right)$

54) $-4, -2, -1, 1$

55) $\{\pm 4, \pm 4i\}$

56) $\left\{\frac{5 \pm i\sqrt{115}}{2}\right\}$

57) $\{\pm\sqrt{7}, \pm\sqrt{6}\}$

58) {125, 8}

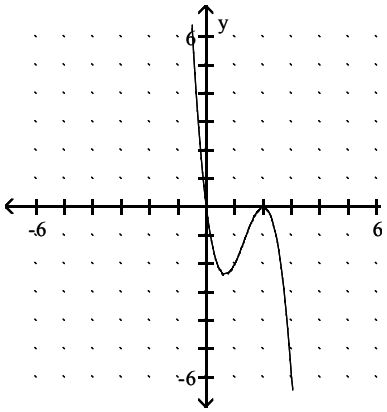
59) Yes

Answer Key

60) Does not cross at (2, 0) , crosses at (-6, 0)

61) Does not cross at (3, 0), crosses at (-3, 0)

62)

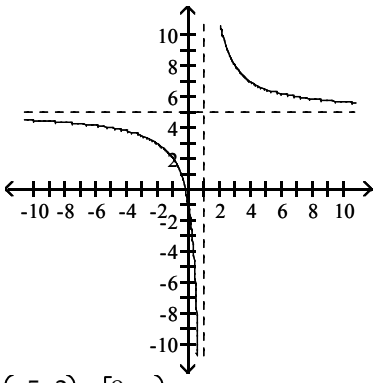


63) x = 3, x = -3

64) y = x - 10

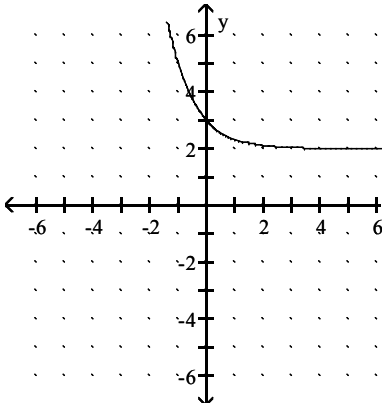
65) $y = \frac{6}{5}$

66)

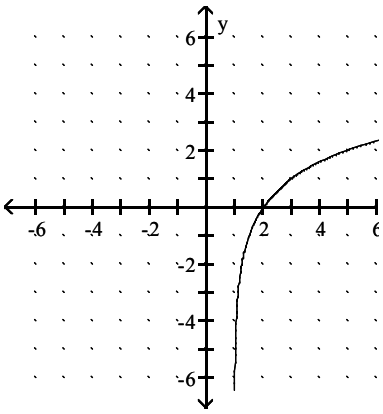


67) $(-5, 2) \cup [9, \infty)$

68)



69)



70) {2}

71) -2

72) -8

73) $\left[\frac{3}{2}, \infty\right)$

74) 8

75) t

76) $\log_2((6x - 1)^6(5x - 4)^4)$

77) $4 \log_5(x) + 7 \log_5(y) - \log_5(4)$

78) 1.597

79) ±7

80) 15.7 years

81) 7

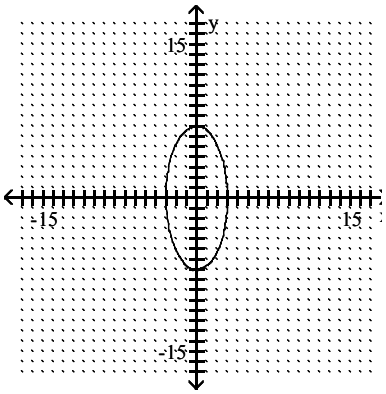
82) $\frac{18}{5}$

83) $28,313.18

84) 1911 years

85) 5.7 years

86)



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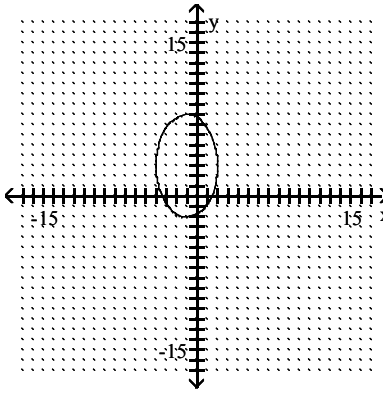

88)