

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Determine whether or not the function is one-to-one.

1) $f(x) = -0.61$

1) _____

2) $f(x) = \sqrt{x+4}$

2) _____

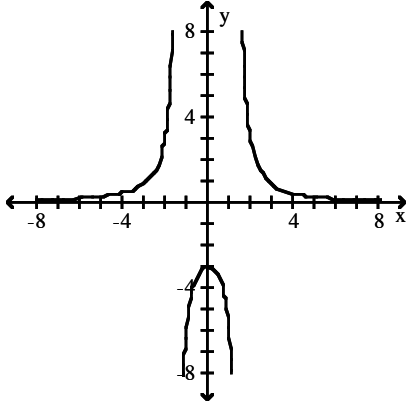
3) $f(x) = (5x - 4)^2$

3) _____

Determine whether or not the function is one-to-one.

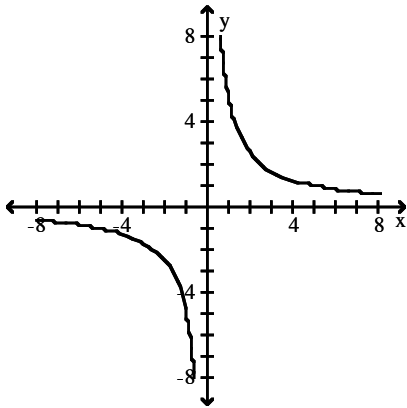
4)

4) _____



5)

5) _____



Decide whether or not the functions are inverses of each other.

6) $f(x) = \frac{5}{x+6}$, $g(x) = \frac{6x+5}{x}$

6) _____

7) $f(x) = 2x + 4$, $g(x) = \frac{1}{2}x - 2$

7) _____

If f is one-to-one, find an equation for its inverse.

8) $f(x) = 5x^3 + 1$

8) _____

9) $f(x) = \sqrt{x-9}, x \geq 9$

9) _____

10) $f(x) = -\sqrt{x^2-25}, x \geq 5$

10) _____

Find the domain and range of the inverse of the given function.

11) $f(x) = x^3 + 5$

11) _____

12) $f(x) = \sqrt{x-5}$

12) _____

The given function is one-to-one. Find $f^{-1}(x)$.

13) $f(x) = \frac{4x}{x+10}$

13) _____

14) $f(x) = \frac{3x-2}{x+5}$

14) _____

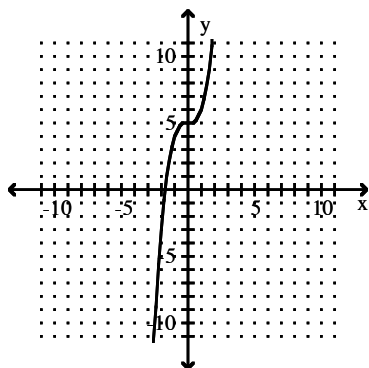
15) $f(x) = 7x^3 - 1$

15) _____

Use the graph of f to sketch a graph of the inverse of f using a dashed curve.

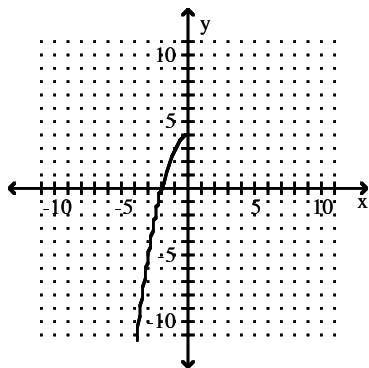
16)

16) _____



17)

17) _____



Decide on a suitable restriction on the domain so that the function is one-to-one and the range is not changed.

18) $f(x) = (x+12)^2$

18) _____

19) $f(x) = |x - 20|$

19) _____

20) $f(x) = \sqrt{25 - x^2}$

20) _____

Using the restrictions stated for the function, find a rule for f^{-1} .

21) $f(x) = -x^2 + 4, x \geq 0$

21) _____

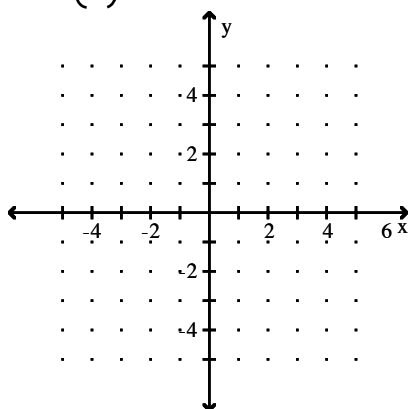
22) $f(x) = |x - 11| - 3, x \geq 11$

22) _____

Graph the function.

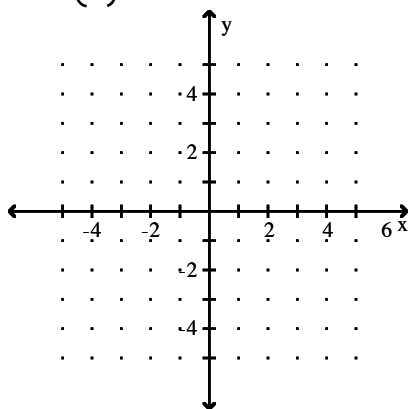
23) $f(x) = \left(\frac{7}{2}\right)^x$

23) _____



24) $f(x) = \left(\frac{4}{5}\right)^x$

24) _____



Solve the equation.

25) $3(8 - 2x) = 81$

25) _____

26) $8x - 1 = 32^{3x}$

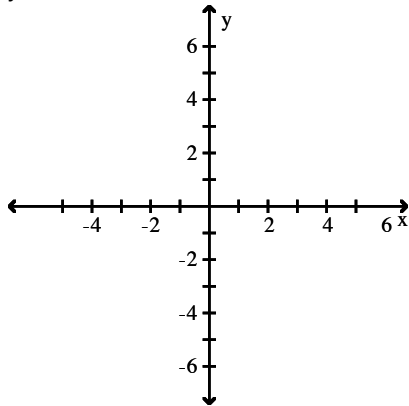
26) _____

27) $e^x - 2 = \left(\frac{1}{e^2}\right)^{x+2}$

27) _____

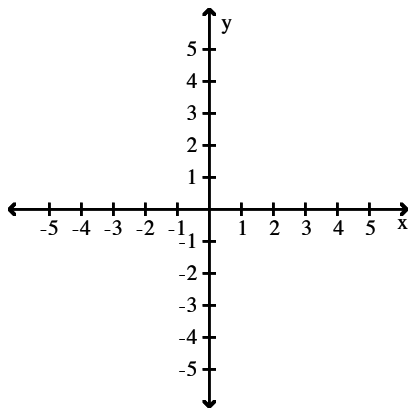
Graph the function.

28) $y = 5^x - 2 + 1$



28) _____

29) $f(x) = e^{3x} - 1$



29) _____

Solve the inequality. Express the answer in interval notation.

30) $27^{2x} \geq 9x + 1$

30) _____

31) $\left(\frac{4}{5}\right)^{x+1} \leq \left(\frac{625}{256}\right)^{x-1}$

31) _____

Use the compound interest formula to determine the final value of the given amount.

32) \$1,000 at 8% compounded semiannually for 9 years

32) _____

33) \$480 at 9% compounded quarterly for 6 years

33) _____

Solve the problem.

34) In September 1998 the population of the country of West Goma in millions was modeled by $f(x) = 16.9e^{0.0019x}$. At the same time the population of East Goma in millions was modeled by $g(x) = 13.4e^{0.0173x}$. In both formulas x is the year, where $x = 0$ corresponds to September 1998. Assuming these trends continue, estimate the year when the population of West Goma will equal the population of East Goma.

34) _____

Write an equivalent expression in logarithmic form.

35) $4^{-3} = \frac{1}{64}$ 35) _____

36) $10^{-3} = 0.001$ 36) _____

Write an equivalent expression in exponential form.

37) $\log_3 \left(\frac{1}{27} \right) = -3$ 37) _____

38) $\log_4 2 = \frac{1}{2}$ 38) _____

Solve the equation.

39) $\log_x 64 = -2$ 39) _____

40) $\log_4 x = 3$ 40) _____

41) $\log_4 \frac{1}{16} = x$ 41) _____

42) $\log_5(x - 1) = 4$ 42) _____

Use the properties of logarithms to rewrite the logarithm if possible. Assume that all variables represent positive real numbers.

43) $\log_{15} \frac{\sqrt[4]{17}}{s^2r}$ 43) _____

44) $\log_n \sqrt[3]{\frac{6x^9}{z^8}}$ 44) _____

45) $\log_2 (8x + 2y)$ 45) _____

Use the product, quotient, and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

46) $\frac{9}{7} \log_n 4q^2 + \frac{5}{3} \log_n 16q^2$ 46) _____

47) $4 \log_3 (3x + 7) + 6 \log_3 (4x + 2)$ 47) _____

Use the change-of-base rule to find the logarithm to four decimal places.

48) $\log_{7.4} 3.1$

48) _____

49) $\log_9 0.61$

49) _____

Provide an appropriate response.

50) In the expression $y = \log_a x$, what restrictions, if any, are there on the value of x ?

50) _____

51) Change $y = a^x$ to a logarithmic equation.

51) _____

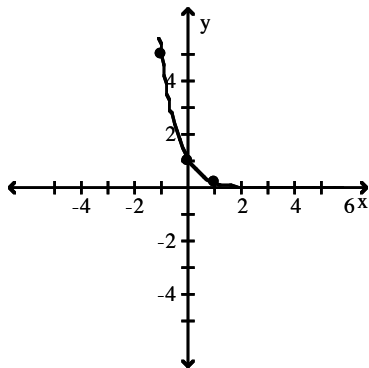
52) Use a property of logarithms to evaluate $\log_8 8^{16}$.

52) _____

The graph of an exponential function f is given, along with coordinates for three points. Sketch the graph of f^{-1} by hand, giving coordinates of three points on its graph. State the equation of its vertical asymptote.

53)

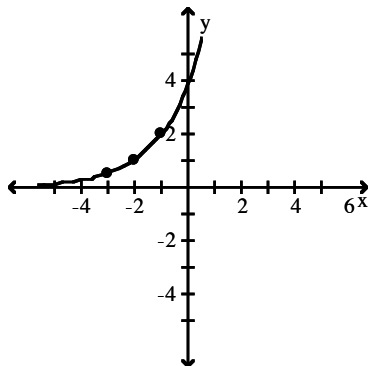
53) _____



points: $(-1, 5)$, $(0, 1)$, and $\left(1, \frac{1}{5}\right)$

54)

54) _____



points: $\left(-3, \frac{1}{2}\right)$, $(-2, 1)$, and $(-1, 2)$

Find the domain of the function.

55) $f(x) = \ln |x + 3|$

55) _____

56) $f(x) = \log(x - 9)$

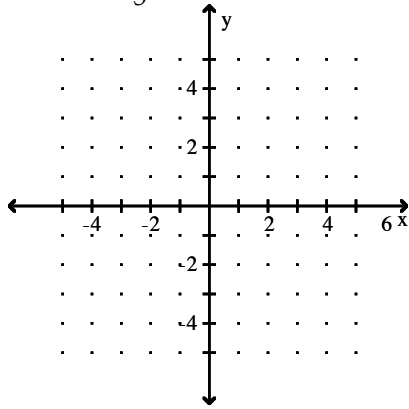
56) _____

57) $f(x) = \ln(8x - x^2)$

57) _____

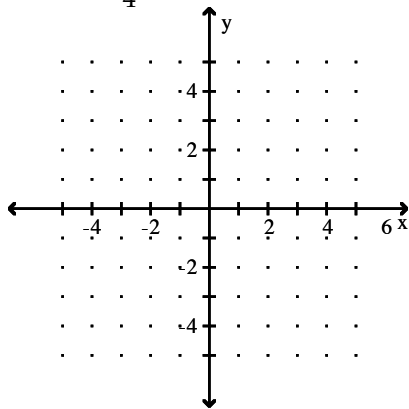
Graph the function.

58) $f(x) = (\log_5 x) + 4$



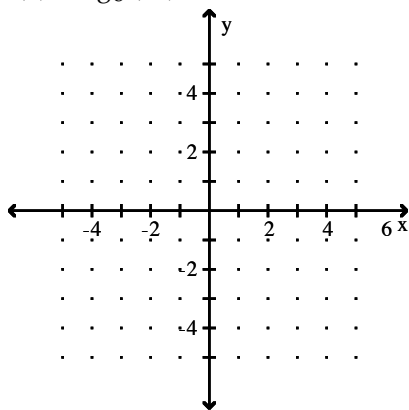
58) _____

59) $f(x) = \log_4 (x+3)$



59) _____

60) $f(x) = \log_6 (x^6)$



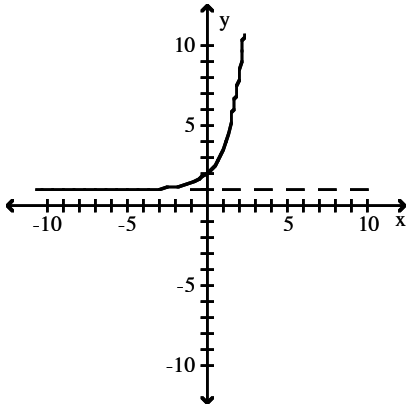
60) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine the function which corresponds to the given graph.

61)

61) _____



The asymptote is $y = 1$.

A) $y = e^{x+1}$

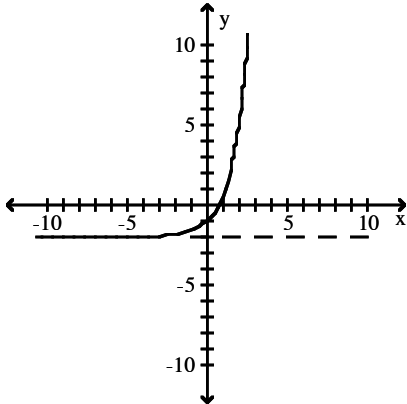
B) $y = e^{x-1}$

C) $y = e^x - 1$

D) $y = e^x + 1$

62)

62) _____



The asymptote is $y = -2$.

A) $y = e^x - 2$

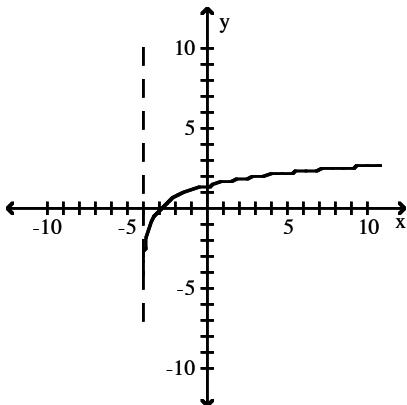
B) $y = e^x + 2$

C) $y = e^x - 2$

D) $y = e^x + 2$

63)

63) _____



The asymptote is $x = -4$.

A) $y = \ln(x + 4)$

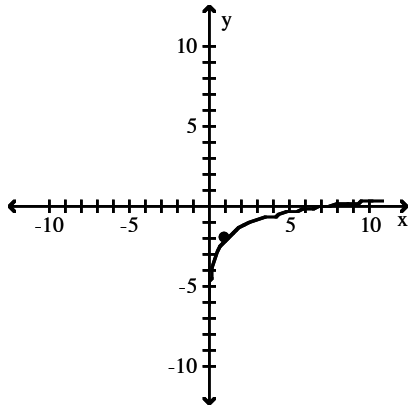
B) $y = \ln(x - 4)$

C) $y = \ln x - 4$

D) $y = \ln x + 4$

64)

64) _____

The indicated point is $(1, -2)$.

A) $y = \ln x + 2$

B) $y = \ln x - 2$

C) $y = \ln(x - 2)$

D) $y = \ln(x + 2)$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the inverse of the function.

65) $f(x) = 3^x + 10$

65) _____

66) $f(x) = \left(\frac{1}{5}\right)^x - 2$

66) _____

Solve the problem.

67) Wind speed varies in the first twenty meters above the ground. For a particular day, let $f(x) = 1.3 \ln x + 2.8$ compute the wind speed x meters above the ground. What is the wind speed 6 meters above the ground? Round your result to the nearest hundredth.

67) _____

68) Suppose that the salinity S of ocean water at a given depth d is modeled by the equation $S(d) = 31.5 + 1.5 \log(d + 1)$, where S is measured in grams salt per kilogram water and d is measured in meters. What is the salinity when the depth is 842 m? Round your answer to the nearest hundredth.

68) _____

Provide an appropriate response.

69) Explain how the graph of $y = \log_5 x + 7$ can be obtained from the graph of $y = \log_5 x$.

69) _____

70) Explain how the graph of $y = 3 \log_2 x + 6$ can be obtained from the graph of $y = \log_2 x$.

70) _____

Solve the equation and express the solution in exact form using either \ln or \log as indicated.

71) $3^{-x} = \frac{1}{27}$ Express the answer using \ln .

71) _____

72) $3(6 - 2x) = 9$ Express the answer using \log .

72) _____

73) $2(5 - 3x) = \frac{1}{16}$ Express the answer using \ln .

73) _____

Solve the equation. Round to the nearest thousandth.

74) $4(x - 2) = 25$ 74) _____

75) $2^{x+3} = 5^x$ 75) _____

76) $9e^{7x+8} = 7$ 76) _____

Solve the equation and express the solution in exact form.

77) $\log_5 x = 2$ 77) _____

78) $\log(x + 9) = 1 - \log x$ 78) _____

79) $\log_4(x - 8) + \log_4(x - 8) = 1$ 79) _____

80) $\ln e^{\ln x} - \ln(x - 3) = \ln 9$ 80) _____

Solve for the indicated variable.

81) $D - D_0 = (D_1 - D_0)10^{-kt}$, for t 81) _____

82) $A = \frac{sW}{1 - (1 + z)^{-t}}$, for t Express the answer using ln. 82) _____

Solve the equation. Give exact solutions.

83) $8e^{2x} + 17e^x = 21$ 83) _____

84) $\frac{1}{2}e^{2x} + 2e^x = \frac{1}{2}$ 84) _____

85) $(\log_2 x)^2 + 2 \log_2 x = 3$ 85) _____

Use any method (analytic or graphical) to solve the equation. If necessary, round the answer to the nearest thousandth.

86) $\log_2 \sqrt{2x^2} = \frac{5}{2}$ 86) _____

87) $\log x^2 = (\log x)^2$ 87) _____

Solve the problem.

88) Suppose $f(x) = 32.3 + 1.3 \log(x + 1)$ models salinity of ocean water to depths of 1000 meters at a certain latitude. x is the depth in meters and $f(x)$ is in grams of salt per kilogram of seawater. Approximate the depth (to the nearest tenth of a meter) where the salinity equals 36. 88) _____

Provide an appropriate response.

89) Write the algebraic equation which can be used to find the exact solution of
 $\log_2(x - 3) - \log_2(x + 7) = 3$.

89) _____