

**Solve the system by the substitution method. If there is no solution or an infinite number of solutions, so state. Use set notation to express the solution set.**

$$1) \begin{cases} x - 5y = 14 \\ 3x - 6y = 15 \end{cases}$$

1) \_\_\_\_\_

$$2) \begin{cases} 4x + y = 11 \\ 16x + 4y = 44 \end{cases}$$

2) \_\_\_\_\_

**Solve the problem.**

3) One number is 3 less than a second number. Twice the second number is 21 more than 3 times the first. Find the two numbers.

3) \_\_\_\_\_

4) A tour group split into two groups when waiting in line for food at a fast food counter. The first group bought 8 slices of pizza and 5 soft drinks for \$30.33. The second group bought 7 slices of pizza and 6 soft drinks for \$28.96. How much does one slice of pizza cost?

4) \_\_\_\_\_

**Solve the system by the addition method. If there is no solution or an infinite number of solutions, so state. Use set notation to express the solution set.**

$$5) \begin{cases} x + y = 1 \\ x + y = -3 \end{cases}$$

5) \_\_\_\_\_

$$6) \begin{cases} 7x + 6y = 34 \\ 5x - 4y = -42 \end{cases}$$

6) \_\_\_\_\_

**Solve the problem.**

7) Devon purchased tickets to an air show for 8 adults acid solution in order to get an 80% acid solution? 8) \_\_\_\_\_

\_\_\_\_\_

9) The owners of a candy store want to sell, for \$6 per pound, a mixture of chocolate-covered raisins, which usually sells for \$3 per pound, and chocolate-covered macadamia nuts, which usually sells for \$8 per pound. They have a 60-pound barrel of the raisins. How many pounds of the nuts should they mix with the barrel of raisins so that they hit their target value of \$6 per pound for the mixture?

9) \_\_\_\_\_

10) Julie and Eric row their boat (at a constant speed) 63 miles downstream for 7 hours, helped by the current. Rowing at the same rate, the trip back against the current takes 9 hours. Find the rate of the current.

10) \_\_\_\_\_

**Solve the system. If there is no solution or if the system's equations are dependent, so state.**

$$11) \begin{cases} x + y + z = 8 \\ x - y + 2z = 3 \\ 5x + y + z = 0 \end{cases}$$

11) \_\_\_\_\_

$$12) \begin{cases} x + y + z = -4 \\ x - y - 4z = 1 \\ 3x + 3y + 3z = -12 \end{cases} \quad 12) \underline{\hspace{2cm}}$$

**Find the domain and range.**

$$13) \{(9,3), (9,-7), (5,8), (-10,7), (-6,-6)\} \quad 13) \underline{\hspace{2cm}}$$

**Decide whether the relation is a function.**

$$14) \{(-4, 4), (-1, 2), (4, 9), (4, 7)\} \quad 14) \underline{\hspace{2cm}}$$

**Find the indicated function value.**

$$15) \text{ Find } f(-4) \text{ when } f(x) = \frac{x^3 + 4}{x^2 + 2}. \quad 15) \underline{\hspace{2cm}}$$

16)

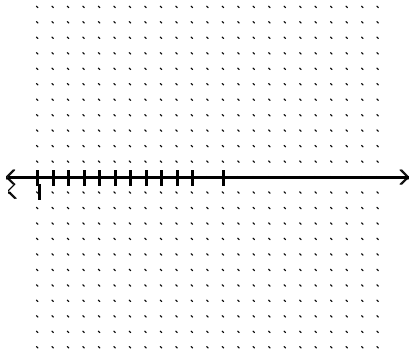
x	f(x)	
-4	-1	
-3	3	Find
0	15	1
3	27	<b>function value.</b>
4	31	15) Find

**Find**

**Multiply and simplify. Assume that all variables represent positivvariables 1**

**Solve the formula for the specified variable. Assume all variables represent nonnegative numbers. If possible,**

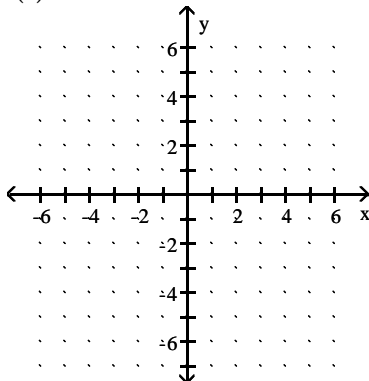
57)



Graph the function by making a table of coordinates.

63)  $f(x) = 5^x$

63) \_\_\_\_\_



Write the equation in its equivalent exponential form.

64)  $\log_2 32 = x$

64) \_\_\_\_\_

Write the equation in its equivalent logarithmic form.

65)  $13^2 = y$

65) \_\_\_\_\_

Evaluate the expression without using a calculator.

66)  $\log_7 \sqrt{7}$

66) \_\_\_\_\_

67)  $\log_{125} 5$

67) \_\_\_\_\_

Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

68)  $\log_b(yz^8)$

68) \_\_\_\_\_

69)  $\log_b\left(\frac{xy^5}{z^6}\right)$

69) \_\_\_\_\_

Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expressions.

70)  $8 \ln x - \frac{1}{4} \ln y$

70) \_\_\_\_\_

71)  $2 \ln a - 9 \ln b$

71) \_\_\_\_\_

Use common logarithms or natural logarithms and a calculator to evaluate to four decimal places

72)  $\log_6 3$

72) \_\_\_\_\_

Solve the equation by expressing each side as a power of the same base and then equating exponents.

73)  $3^x = \frac{1}{81}$

73) \_\_\_\_\_

74)  $2^{-x} = 8$

74) \_\_\_\_\_

75)  $3(1 + 2x) = 27$

75) \_\_\_\_\_

**Solve the logarithmic equation. Give an exact answer.**

76)  $\log_3 10 + \log_3 x = 1$

76) \_\_\_\_\_

77)  $\log_3(x + 2) - \log_3 x = 2$

77) \_\_\_\_\_

78)  $\ln 5 + \ln(x - 1) = 0$

78) \_\_\_\_\_

79)  $\log(5 + x) - \log(x - 4) = \log 2$

79) \_\_\_\_\_

**Solve the problem.**

80) The formula  $A = 121e^{0.031t}$  models the population of a particular city, in thousands,  $t$  years after 2011. When will the population of the city reach 150 thousand?

80) \_\_\_\_\_

**Solve.**

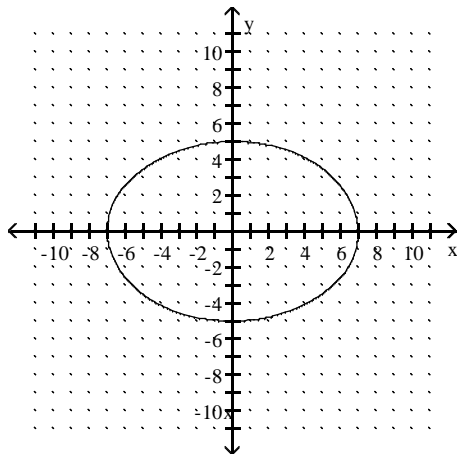
81) The value of a particular investment follows a pattern of exponential growth. You invested money in a money market account. The value of your investment  $t$  years after your initial

\_\_\_\_\_ follows a pattern of



Find the standard form of the equation of the ellipse.

84)



**Find the common difference for the arithmetic sequence.**

94) 8, 11, 14, 17, ...

94) \_\_\_\_\_

**Write the first five terms of the arithmetic sequence with the given first term,  $a_1$ , and common difference,  $d$ .**

95)  $a_1 = 4$ ;  $d = 4$

95) \_\_\_\_\_

**Find the common ratio for the geometric sequence.**

96) 1, -3, 9, -27, 81, ...

96) \_\_\_\_\_

**Write the first four terms of the geometric sequence with the given first term,  $a_1$ , and common ratio,  $r$ .**

97)  $a_1 = 5$ ;  $r = 2$

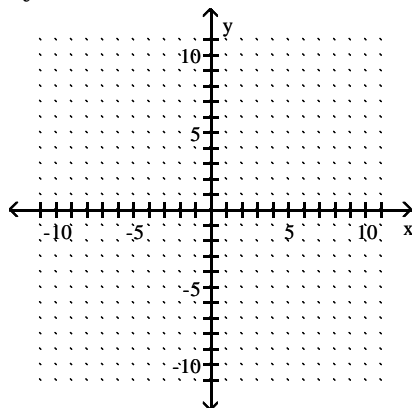
97) \_\_\_\_\_

**Complete the**

Use vertices and asymptotes to graph the hyperbola.

100)  $9y^2 - 4x^2 = 36$

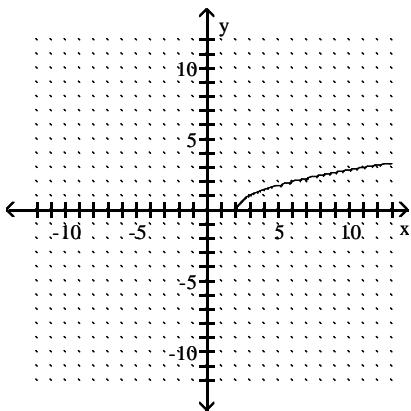
100)



# Answer Key

Testname: MATH 91 SAMPLE TEST NONMULTIPLE

- 1)  $\{(-1, -3)\}$
- 2) infinitely many solutions;  $\{(x, y) \mid 4x + y = 11\}$  or  $\{(x, y) \mid 16x + 4y = 44\}$
- 3) -15 and -12
- 4) \$2.86 per slice of pizza
- 5) no solution;
- 6)  $\{(-2, 8)\}$
- 7) adult s ticket: \$22; child s ticket: \$17
- 8) 7.5 gal
- 9) 90 pounds
- 10) 1 mph
- 11)  $\{(-2, 5, 5)\}$
- 12) no solution or
- 13) domain =  $\{-6, -10, 9, 5\}$ ; range =  $\{-6, 7, -7, 8, 3\}$
- 14) not a function
- 15)  $-\frac{10}{3}$
- 16) 27
- 17) 1.5
- 18)  $(- , -3)$  or  $(-3, )$
- 19) -13
- 20) -35
- 21)  $63x^2 + 15x$
- 22)  $6x + 9$
- 23)  $f^{-1}(x) = \frac{x + 7}{8}$
- 24) -3
- 25) domain of f:  $[2, )$



- 26) -2
- 27) 16
- 28) 4
- 29)  $\frac{1}{1000}$
- 30)  $10\sqrt{6x}$
- 31)  $-3a^3b^3\sqrt[3]{a^2b}$
- 32)  $4xy\sqrt{6y}$

**Answer Key**

**Testname: MATH 91 SAMPLE TEST NONMULTIPLE**

33) 6

# Answer Key

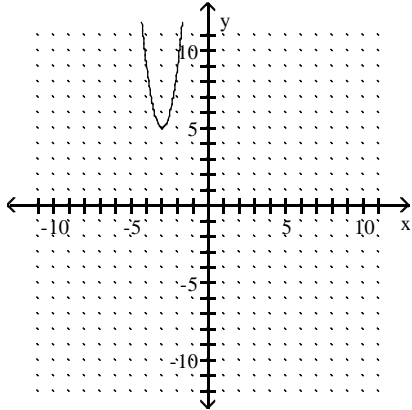
Testname: MATH 91 SAMPLE TEST NONMULTIPLE

58) vertex:  $(-3, 5)$

x-intercepts: none

y-intercept:  $(0, 41)$

axis of symmetry:  $x = -3$



# Answer Key

Testname: MATH 91 SAMPLE TEST NONMULTIPLE

73)  $\{-4\}$

74)  $\{-3\}$

75)  $\{1\}$

76)  $\left\{\frac{3}{10}\right\}$

77)  $\left\{\frac{1}{4}\right\}$

78)  $\left\{\frac{6}{5}\right\}$

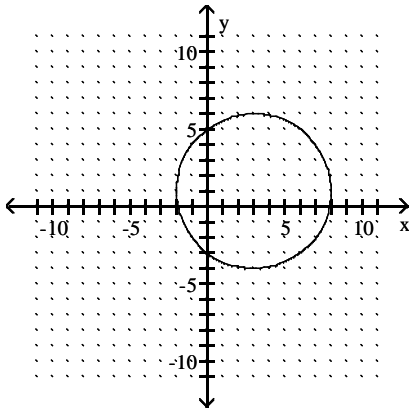
79)  $\{13\}$

80) 2018

81) 9 years after the initial investment

82)  $(x + 6)^2 + (y + 2)^2 = 1$

83) center  $(3, 1)$ ,  $r = 5$



84)  $\frac{x^2}{49} + \frac{y^2}{25} = 1$

85)  $(-1, 0), (1, 0)$

86) nonlinear system

87)  $\{(2, 4)\}$

88)  $\{(\sqrt{3}, 0), (-\sqrt{3}, 0)\}$

89) 3, 7, 11, 15

90) -4, 16, -64, 256

91) 1, 16,  $\frac{81}{2}$ ,  $\frac{128}{3}$

92) 40

93) 30

94) 3

95) 4, 8, 12, 16, 20

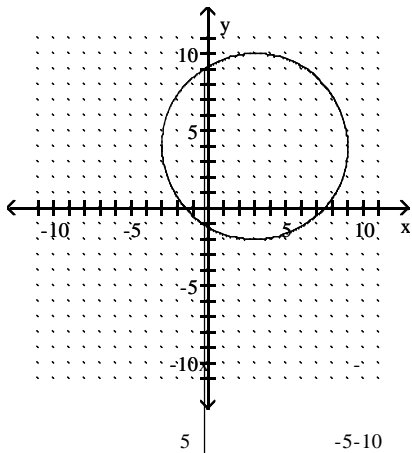
96) -3

97) 5, 10, 20, 40, ...

# Answer Key

Testname: MATH 91 SAMPLE TEST NONMULTIPLE

98)  $(x - 3)^2 + (y - 4)^2 = 36$   
center (3, 4), r = 6



1

0

-

5

5

5

-5-10