

# *Departmental Final Review*

## *for MAT 0024*

*Check your answers with the answer key at the end of the packet, and if additional review is needed refer to the section in your textbook for more examples.*

*You are allowed to use a calculator on the Department Final, but not on the EXIT Exam.*

*Revised October 2007*

**Symbols and Sets of Numbers (Section 1.2, Section 1.4)**

In questions 1 – 3 insert  $>$ ,  $<$  or  $=$  to make each statement true.

1.  $2$  \_\_\_\_\_  $-(-2)$       2.  $|-3|$  \_\_\_\_\_  $-|-3|$       3.  $-7$  \_\_\_\_\_  $-4$

**Exponents & Order of Operations (Sections 1.3 – 1.6)**

In questions 4 – 9 simplify each expression.

4.  $-18 \div 3 \cdot 2 - 7$       5.  $2[5 + 2(3 - 8)]$       6.  $\frac{14 + |12 - 5| + (-3)^2}{2 - (-8)}$

7.  $\frac{-5^2 - |-7 - 4|}{-1 - 4(2)}$       8.  $-\frac{2}{9} - \frac{1}{4}$       9.  $\frac{12}{15} \div \left(-\frac{6}{5}\right)$

**Evaluate Variable Expressions (Sections 1.3, 1.6)**

Evaluate each expression when  $x = -2$ ,  $y = 3$  and  $z = -5$ .

10.  $2x^2y - z$       11.  $\frac{y^2 - 3x}{z}$       12.  $4x^2 - 3x + 1$

**Simplify Expressions (Section 1.8)**

13.  $5(2x - 5) - 12x$       14.  $-2k + 7 - (6k - 3)$

15.  $4(2x - 3) - 3(x + 1)$       16.  $7(2y - 5) - 4(2y - 3) - 4y$

*Linear Equations (Sections 2.1 – 2.3)*

17.  $-6x - 5 = 25$

18.  $\frac{2}{3}x = -6$

19.  $2x - 7 = 6x - 27$

20.  $-5 = -2m + 7$

21.  $-4(2y + 1) = -5y + 5$

22.  $7(n - 1) + 9 = 5n$

23.  $-5y - 7 - y = -(2y + 3)$

24.  $2(3x - 4) = 6 + 7x$

25.  $\frac{x}{5} - 7 = \frac{x}{3} - 5$

26.  $\frac{5}{2}x - 1 = x + \frac{1}{4}$

*Problem Solving with Linear Equations (Sections 2.4 – 2.6)*

*Translation Problems*

For each question use an equation to solve each problem.

27. The product of 8 and a number increased by 17 is the difference between three times the number and 8. Find the number.
28. Three times the sum of twice a number and 5 is  $-9$ . Find the number.
29. A 35-foot wire is to be cut in two pieces so that the longer piece is 4 times the shorter piece. Find the length of each piece.
30. a) The sum of three consecutive integers is 168. Find the integers.
- b) The sum of three consecutive even integers is 168. Find the integers.

*Perimeter Problems*

31. The length of a rectangular road sign is 2 feet less than four times its width. Find the dimensions if the perimeter is 36 feet.
32. If the length of a rectangular parking lot is 20 meters more than twice its width, and the perimeter is 400 meters, find the length of the parking lot.

*Percent Problems*

33. Find 28% of 70.
34. 27 is what percent of 150?
35. A dinner for two is \$70 including tax. Find the total cost if a 15% tip is added to the cost.
36. Find the original price of a watch if the sale price is \$98 after a 30% discount.

*Mixture Problem*

37. A coffee shop owner wants to make a new flavor of coffee. How many pounds of coffee worth \$9 a pound should be added to 12 pounds of coffee worth \$4 a pound to get a mixture worth \$6 a pound? Complete the chart. Then, solve the problem using a linear equation.

	Number of Pounds	Cost per Pound	Value
\$9 per pound Coffee	$x$		
\$4 per pound Coffee	12		
\$6 per pound New Flavor	$x + 12$		

*Formulas (Section 2.5)*

Solve for the indicated variable.

38.  $V = 2Ah$  for  $A$
39.  $4x + y = 7$  for  $y$
40.  $2q + 3p = 5$  for  $p$

**Linear Inequalities (Section 2.7)**

**41. Solve:**  $-3x + 2 \leq 17$

**42. Solve:**  $4x - 5 > 2x - 1$

**Rules of Exponents (Sections 3.1 – 3.2)**

**Simplify each expression. Write each result using positive exponents only.**

**43.**  $x^5 \cdot x^3$

**44.**  $(-7a^4b)(4a^2b^3)$

**45.**  $(-7x^5y^3)(-7x^{12}y^4)$

**46.**  $(a^4)^3$

**47.**  $(-3a^3b)^2$

**48.**  $(2x^4y^2z^6)^3$

**49.**  $\frac{a^8}{a^2}$

**50.**  $\frac{12x^2}{6x^9}$

**51.**  $\frac{27a^{10}b^4}{3a^7b^6}$

**52.**  $(-5a^0b^2)^3$

**53.**  $(5ab^2)^0$

**54.**  $10^2 - 10^0$

**55.**  $x^{-2}$

**56.**  $6^{-2}$

**57.**  $\frac{1}{x^{-2}}$

**58.**  $(x^3y^{-4})^{-1}$

**59.**  $(-4a^2bc^{-1})^3$

**60.**  $\frac{-12m^8n^{-6}}{4m^{-2}n^{-3}}$

*Scientific Notation (Section 3.2)*

Write each number in scientific notation.

61. 75,000,000

62. 0.000256

*Polynomials (Sections 3.3 – 3.7)*

Perform each indicated operation.

63.  $(8x^2 + 2x - 7) + (-4x^2 - 5x - 4)$

64.  $(-6x^2 + 8xy - 10y) - (6x^2 - 4xy + 2y)$

65.  $4x(6x^2 - 3x + 5)$

66.  $3xy^2(5x^3 + x^2y^2 - 9y^2)$

67.  $(3y - 5)(2y - 8)$

68.  $(x + 5)(3x - 1)$

69.  $(2x - 9)(2x + 9)$

70.  $(10x - 3)^2$

71. 
$$\frac{-15a^4 + 21a^2 - 9a}{3a}$$

72. 
$$\frac{12x^5 - 8x^2 - 4x}{4x^2}$$

*Factoring (Sections 4.1 – 4.5)*

**Factor each polynomial.**

**73.**  $20a - 15$

**74.**  $32xy^2 - 18x^2y$

**75.**  $2y - 8 + xy - 4x$

**76.**  $4a^2 - 8ab - 3a + 6b$

**77.**  $x^2 + 5x + 6$

**78.**  $x^2 - 8x + 15$

**79.**  $x^2 - x - 30$

**80.**  $a^2 + 4a - 32$

**81.**  $3x^2 + 22x + 7$

**82.**  $2x^2 - 7x - 15$

**83.**  $10r^2 - 9r + 2$

**84.**  $7x^2 - 4x - 11$

**85.**  $x^2 - 16x + 64$

**86.**  $x^2 - 81$

**87.**  $9x^2 - 49$

**88.**  $4a^2 - 25y^2$

**Factor completely. Hint: Factor out the GCF first.**

**89.**  $2x^2 + 20x + 32$

**90.**  $4x^3 + 4x^2 - 48x$

**91.**  $2x^2 - 18$

*Quadratic Equations (Section 4.6)*

**92.**  $x^2 + 2x - 63 = 0$

**93.**  $5x^2 - 6x - 8 = 0$

**94.**  $9x^2 + 7x = 2$

*Simplify Rational Expressions (Section 5.1)*

**95.**  $\frac{7x - 42}{x^2 - 6x}$

**96.**  $\frac{3x^2 - 12}{6x - 12}$

**97.**  $\frac{x^2 + 7x + 10}{2x^2 + 11x + 5}$

*Proportions (Section 5.6)*

**98.** A machine can process 300 parts in 20 minutes. Find how many parts can be processed in 45 minutes.

**99.** In a sample of 85 fluorescent bulbs, 3 were found to be defective. At this rate, how many defective bulbs should be found in 510 bulbs?

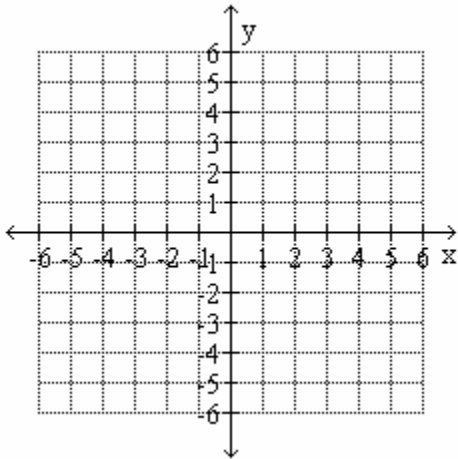
*Plotting Points (Section 6.1)*

100. What quadrant or on which axis does each point lie?

- a) (3,4)
- b) (0,-4)
- c) (-5,-7)
- d) (2,-7)
- e) (-10,0)

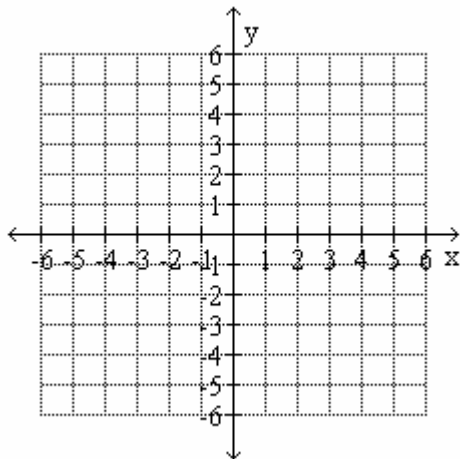
*Graphing Linear Equations (Section 6.2)*

101. For the equation  $y = -4x + 2$  complete the table of ordered pairs. Then, use the ordered pairs to graph the equation.



x	y
0	
1	
2	

102. For the equation  $y = 2x - 3$  find three ordered pair solutions by completing the table. Then, use the ordered pairs to graph the equation.



x	y



**MAT 0024****Answer Key to Dept Final Review**

1. =                      2. >                      3. <                      4. -19
5. -10                    6. 3                      7. 4                      8.  $-\frac{17}{36}$
9.  $-\frac{2}{3}$                     10. 29                    11. -3                    12. 23
13.  $-2x - 25$             14.  $-8k + 10$             15.  $5x - 15$             16.  $2y - 23$
17.  $x = -5$               18.  $x = -9$               19.  $x = 5$                 20.  $m = 6$
21.  $y = -3$               22.  $n = -1$               23.  $y = -1$               24.  $x = -14$
25.  $x = -15$             26.  $x = \frac{5}{6}$                 27.  $x = -5$               28.  $x = -4$
29. 7 ft and 28 ft            30. a) 55, 56, 57            b) 54, 56, 58
31. 4 ft by 14 ft            32. 60 ft by 140 ft            33. 19.60
34. 18%                    35. \$80.50                36. 140
37. 8 pounds of the coffee worth \$9 a pound
38.  $A = \frac{V}{2h}$               39.  $y = -4x + 7$               40.  $p = -\frac{2}{3}q + \frac{5}{3}$  or  $p = \frac{-2q + 5}{3}$
41.  $x \geq -5$               42.  $x > 2$                 43.  $x^8$                     44.  $-28a^6b^4$
45.  $49x^{17}y^7$             46.  $a^{12}$                     47.  $9a^6b^2$                 48.  $8x^{12}y^6z^{18}$
49.  $a^6$                     50.  $\frac{2}{x^7}$                     51.  $\frac{9a^3}{b^2}$                     52.  $-125b^6$
53. 1                        54. 99                      55.  $\frac{1}{x^2}$                     56.  $\frac{1}{36}$

57.  $x^2$       58.  $\frac{y^4}{x^3}$       59.  $\frac{-64a^6b^3}{c^3}$       60.  $\frac{-3m^{10}}{n^3}$
61.  $7.5 \times 10^7$       62.  $2.56 \times 10^{-4}$       63.  $4x^2 - 3x - 11$
64.  $-12x^2 + 12xy - 12y$       65.  $24x^3 - 12x^2 + 20x$
66.  $15x^4y^2 + 3x^3y^4 - 27xy^4$       67.  $6y^2 - 34y + 40$
68.  $3x^2 + 14x - 5$       69.  $4x^2 - 81$
70.  $100x^2 - 60x + 9$       71.  $-5a^3 + 7a - 3$
72.  $3x^3 - 2 - \frac{1}{x}$       73.  $5(4a - 3)$
74.  $2xy(16y - 9x)$       75.  $(2 + x)(y - 4)$
76.  $(4a - 3)(a - 2b)$       77.  $(x + 2)(x + 3)$
78.  $(x - 5)(x - 3)$       79.  $(x - 6)(x + 5)$
80.  $(a + 8)(a - 4)$       81.  $(3x + 1)(x + 7)$
82.  $(2x + 3)(x - 5)$       83.  $(5r - 2)(2r - 1)$
84.  $(7x - 11)(x + 1)$       85.  $(x - 8)(x - 8)$

86.  $(x - 9)(x + 9)$

87.  $(3x - 7)(3x + 7)$

88.  $(2a - 5y)(2a + 5y)$

89.  $2(x + 8)(x + 2)$

90.  $4x(x + 4)(x - 3)$

91.  $2(x - 3)(x + 3)$

92.  $x = -9, x = 7$

93.  $x = -\frac{4}{5}, x = 2$

94.  $x = \frac{2}{9}, x = -1$

95.  $\frac{7}{x}$

96.  $\frac{x + 2}{2}$

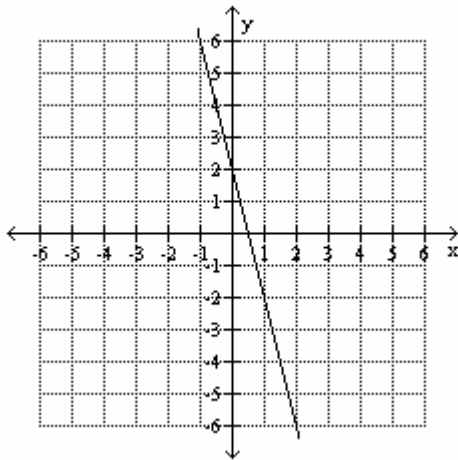
97.  $\frac{x + 2}{2x + 1}$

98. 675 parts

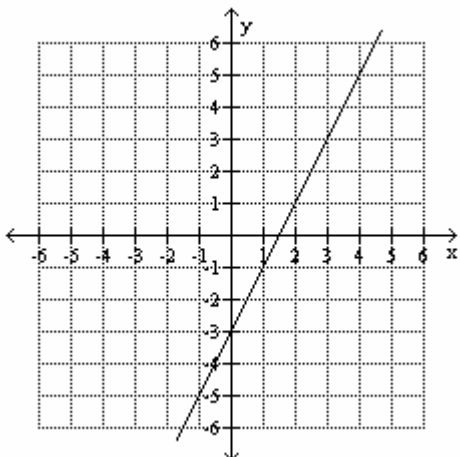
99. 18 defective bulbs

100. a) Quad I    b) y-axis    c) Quad III    d) Quad IV    e) x-axis

101. The ordered pairs are:  $(0, 2), (1, -2), (2, -6)$



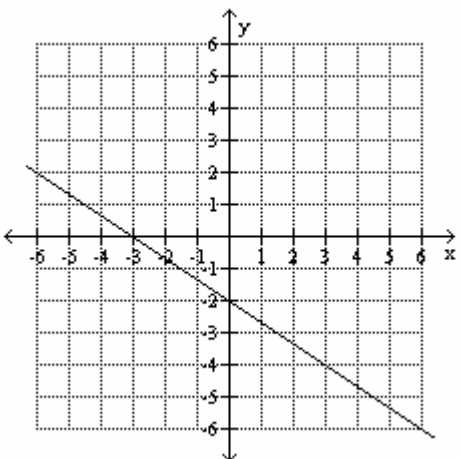
102. Three ordered pair Solutions:  $(0, -3)$ ,  $(1, -1)$ ,  $(2, 1)$



103.  $(-5, 0)$

104.  $(0, 2)$

105. The  $x$ -intercept is  $(-3, 0)$  and the  $y$ -intercept is  $(0, -2)$ .



106.  $x^7 y^{10}$

107.  $6a^3b$

108.  $\frac{10x}{7}$

109.  $2a^2\sqrt{3}$

110.  $4x\sqrt{x}$

111.  $2a^3b\sqrt{10ab}$

112.  $5\sqrt{3}$

113.  $8\sqrt{5}$

114.  $3\sqrt{2}$

115.  $3\sqrt{2}$

116.  $\sqrt{6} + 2$

117.  $\sqrt{10} + 2\sqrt{3}$