

## Test 4 Review Fall 2008 Elementary Algebra Mike Huff

These are the major topics we've studied. Please review your class handouts for examples of each:

1. Order of Operations (This includes simplifying, distributing, combining like terms, and evaluating expressions)
2. Solving Linear Equations and Inequalities (Including solving formulas for an indicated letter)
3. Graphing
4. Polynomials
5. Factoring
6. Solving Quadratic Equations
7. Rational Expressions
8. Solving Systems of Equations
9. Quadratic Equations and the Quadratic Formula
10. Applications (Word Problems)

### Simplify.

$$1. \frac{1}{2} - \left(\frac{1}{2}\right)^2 \cdot \frac{8}{3}$$

$$3. 3^2 \div 3^3 - 3(2 - 5) \div 3$$

$$5. 3 - 2\left(\frac{1}{2}x - 4\right) + 6(x - 2)$$

$$7. \text{ Evaluate } \frac{-b - \sqrt{b^2 - 4ac}}{2a} \text{ if } a = 12, \\ b = 5, \text{ and } c = -2.$$

$$2. 3\left[(4 - 2)^2 + (2 - 3)^2\right] \cdot 4 - 4^2$$

$$4. \frac{3 \cdot (2 - 4)^2 + 2 \cdot 11}{3^2 - (-2)^2}$$

$$6. -2[2x - 2(-x - 3)] - 6(2x - 4)$$

$$8. \text{ Evaluate } 2x^2 - xy + 2x - y \text{ if} \\ x = -\frac{1}{2} \text{ and } y = -\frac{1}{3}$$

### Solve the following equations and inequalities.

$$9. 2(x - 1) - 7(4x + 1) = -(x - 5)$$

$$11. \frac{x}{5} - \frac{x}{4} = 11$$

$$13. M = \frac{a - b}{c} \text{ for } b$$

$$15. 2(x + 3) > 1$$

$$17. 3 - 4t \geq 4 - 2t$$

$$10. \frac{2}{5}(4x - 9) = -2$$

$$12. \frac{2}{3}x - \frac{3}{5} = -\frac{1}{2}x$$

$$14. y = mx + b \text{ for } m$$

$$16. 3(2 - x) \leq 4$$

$$18. \frac{1}{2}\left(2 - \frac{1}{3}x\right) > \frac{4}{3}$$

## Graphing.

For each of the following lines: a) sketch a graph, b) find the  $x$ -intercept, c) find the  $y$ -intercept, and d) find the slope of the line.

19.  $2x - 4y = 8$

20.  $3x + 4y = 12$

21.  $y = -\frac{1}{2}x + 4$

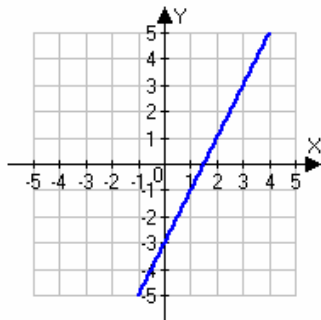
22.  $y - 3 = -\frac{2}{3}(x + 4)$

23.  $x = 4$

24.  $y = 5$

25. Find the slope-intercept equation of the line through the points  $(3, 4)$  and  $(-2, 7)$ .

26. Find the slope-intercept equation of the line whose graph is given.



27. Write an equation of the line parallel to the line  $-3x + 5y = 7$  and passing through  $(-2, -2)$ .

28. Write an equation of the line perpendicular to the line  $-2x - 3y = 6$  and passing through  $(1, -1)$ .

## Polynomials

Simplify and write with only positive exponents:

29.  $\frac{x^4 y^2}{x y^{-3}}$

30.  $\left(\frac{x^5 y^7}{x^6 y^4}\right)^2$

31.  $4\left(\frac{x^2 y}{x}\right)^0$

32.  $3(x^{-4} y^2)^{-2}$

33.  $3(x^{-4} y^2)^{-2}(x^{-1} y^2)^2$

34.  $\left(\frac{-5x^{-2} y}{3z^2}\right)^{-2}$

Perform the indicated operation:

35.  $(-x^2 y^2 + 4xy - 5y^2) + (-4x^2 y^2 - 4xy - 15y^2)$

36.  $(x^2 - 3x + 1) - (-3x^2 + 2x - 5)$

37.  $(4x - 1)(2x^2 - 3x + 4)$

38.  $-2x^2 y(3x^3 y^2 - 2x^2 y^3 - 5xy^4 + 7y^5)$

39.  $(a + 1)(a^2 - a - 3)$

40.  $(-15x^5y^3 - 10x^3y^4 - 5xy^2) \div 5xy^2$

41.  $(12x^2 + 5x - 2) \div (4x - 1)$

42.  $(3x^3 - 2x^2 - 5x + 7) \div (x - 4)$

**Factor completely.**

43.  $3x^2 + 12x + 12$

45.  $2x^3 - x^2 + 8x - 4$

47.  $x^3 - 4x^2$

49.  $3x^2 + 11x - 20$

44.  $2x^2 - xy + 2x - y$

46.  $16x^2 - 4y^2$

48.  $3x^3 - 14x^2 - 5x$

50.  $1 + 4x^2$

**Solve the following quadratic equations.**

51.  $x^2 + 4x + 3 = 0$

53.  $x(3x - 1) = 10$

55.  $3x^2 + 20x + 12 = 0$

57.  $4x^2 + 12x + 9 = 0$

52.  $x^3 - 3x^2 - 28x = 0$

54.  $8x^2 + 33x + 4 = 0$

56.  $x^2 + 16x + 64 = 0$

58.  $9x^2 - 12x = -4$

**Perform the indicated operation.**

59. Simplify:  $\frac{x^2 - 6x + 9}{x^2 - 9}$

61.  $\frac{x^2 - 25}{x^2 - 3x - 10} \cdot \frac{x^2 + 7x + 10}{x^2 + 10x + 25}$

63.  $\frac{2x}{x - 5} - \frac{10}{x - 5}$

60. Simplify:  $\frac{4x^2 - 12x - 40}{2x^2 - 16x + 30}$

62.  $\frac{2x^2 - 9x - 5}{x^2 + 2x - 35} \div \frac{2x^2 - 7x - 4}{x^2 + 3x - 28}$

64.  $\frac{x}{x^2 + 2x - 15} - \frac{3}{x^2 + 2x - 15}$

**Solve the system of equations.**

65.  $y = x + 3$   
 $y = -x + 5$

67.  $2x + 3y = 4$   
 $y = x - 5$

69.  $2x - 5y = 4$   
 $3x - 7y = 15$

66.  $-3x + 2y = 11$   
 $2x + 5y = -18$

68.  $3x + 4y = 2$   
 $2x + 5y = -1$

70.  $x + 2y = 6$   
 $3x + 6y = 6$

**Solve the following quadratic equations using the quadratic formula. If there are no real number solutions, state this.**

71.  $3x^2 + 2x - 8 = 0$

73.  $4x^2 + 4x - 15 = 0$

75.  $x^2 + 2x + 1 = 7$

77.  $x^2 + 6x - 2 = 0$

72.  $x^2 + 2x - 2 = 0$

74.  $4x^2 + 2x + 3 = 0$

76.  $x^2 = 4x + 7$

78.  $x^2 = 64$

## Applications

79. Your bill for lunch was \$26.45. This included a 15% tip. What was the cost of the meal without the tip?
80. After a 13% discount, a new DVD player was selling for \$217.50. What was the original price of the DVD player?
81. The second angle of a triangle is three times as large as the first. The third angle is  $30^\circ$  more than the measure of the first angle. What is the measure of each angle?
82. The number of gallons of tea  $n$  consumed by the average U.S. consumer can be approximated by  $n = \frac{1}{10}d + 7$ , where  $d$  is the number of years since 1991.
- How many gallons were consumed by the average U.S. consumer in 2008?
  - In what year will the average number of gallons consumed be 11?
83. Two angles are complementary. If the measure of one angle is two degrees less than three times the measure of the second, find the measure of each angle.
84. Two angles are supplementary. If the measure of one angle is ten degrees less than three times the measure of the second, find the measure of each angle.
85. The measure of the second angle of a triangle is three times the measure of the first. The measure of the third angle of the triangle is ten degrees less than the measure of the first. Find the measure of all three angles.
86. The perimeter of a rectangle is 60 cm. The width is 8 cm less than the length. Find the width and length of the rectangle.
87. Mike needs to rent a truck to move his mother. We-R-Trucks rents the truck he needs for \$55 per day plus 45¢ per mile. If he needs the truck for one day, how many miles can he drive and stay within a budget of \$100?
88. There were 200 tickets sold for a basketball game. Tickets for students were \$12 each and all other tickets were \$18 each. The total amount collected was \$2700. How many of each type of ticket were sold?
89. Jenna needs 100 liters of 15% alcohol solution. If she has a 12% alcohol solution and a 20% alcohol solution available. How much of each should she mix to get the desired solution?
90. Zelda wishes to mix almonds worth \$9.60 per pound with cashews worth \$10.70 per pound to make 250 pounds of a mixture worth \$9.93 per pound. How much of each type of nut should she use?
91. The length of a rectangle is one foot less than three times the width. Find the length and width if the area is 30 square feet.
92. A water pipe runs diagonally under a rectangular garden that is 7 feet longer than it is wide. If the pipe is 13 feet long, what are the dimensions of the garden?
93. The length of one leg of a right triangle is 12 meters. The length of the hypotenuse is 8 meters longer than the other leg. Find the lengths of the hypotenuse and the other leg of the triangle.

## Answers

1.  $-\frac{1}{6}$

4.  $\frac{34}{5}$

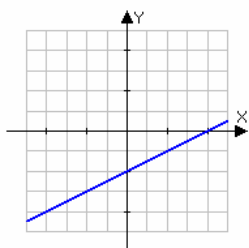
7.  $-\frac{2}{3}$

10.  $x = 1$

13.  $b = a - cM$

16.  $x \geq \frac{2}{3}$

19.

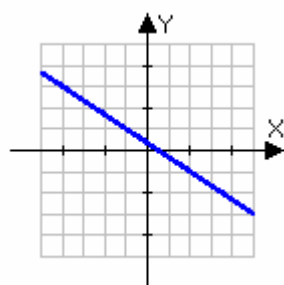


b. x-int: (4,0)

c. y-int: (0,-2)

d.  $m = \frac{1}{2}$

22.



b. x-int:  $(\frac{1}{2}, 0)$

c. y-int:  $(0, \frac{1}{3})$

d.  $m = -\frac{2}{3}$

2. 44

5.  $5x - 1$

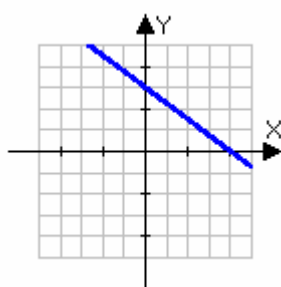
8.  $-\frac{1}{3}$

11.  $x = -220$

14.  $m = \frac{y-b}{x}$

17.  $t \leq -\frac{1}{2}$

20.

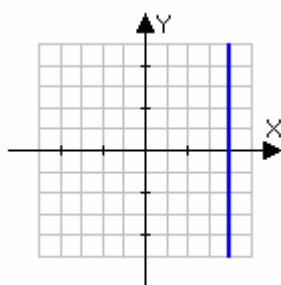


b. x-int: (4,0)

c. y-int: (0,3)

d.  $m = -\frac{3}{4}$

23.



b. x-int: (4,0)

c. y-int: none

d.  $m = \text{undefined}$

3.  $\frac{10}{3}$

6.  $-20x + 12$

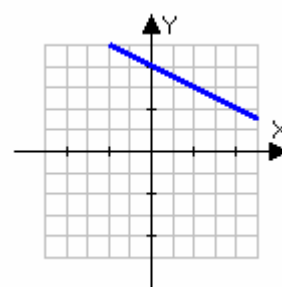
9.  $x = -\frac{14}{25}$

12.  $x = \frac{18}{35}$

15.  $x > -\frac{5}{2}$

18.  $x < -2$

21.

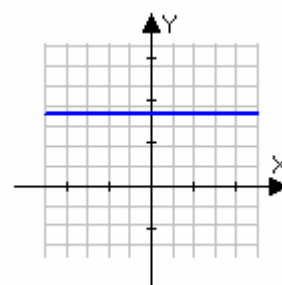


b. x-int: (8,0)

c. y-int: (0,4)

d.  $m = -\frac{1}{2}$

24. m



b. x-int: none

c. y-int: (0,5)

d.  $m = 0$

25.  $y = -\frac{3}{5}x + \frac{29}{5}$

26.  $y = 2x - 3$

27.  $y + 2 = \frac{3}{5}(x + 2)$

28.  $y + 1 = -\frac{2}{3}(x - 1)$

29.  $x^3y^5$

30.  $\frac{y^6}{x^2}$

31. 4

32.  $\frac{3x^8}{y^4}$

33.  $3x^6$

34.  $\frac{9x^4z^4}{25y^2}$

35.  $-5x^2y^2 - 20y^2$

36.  $4x^2 - 5x + 6$

37.  $8x^3 - 14x^2 + 19x - 4$

38.  $-6x^5y^3 + 4x^4y^4 + 10x^2y^5 - 14x^2y^6$

39.  $a^3 - 4a - 3$

40.  $-3x^4y - 2x^2y^2 - 1$

41.  $3x + 2$

42.  $3x^2 + 10x + 35 + \frac{147}{x - 4}$

43.  $3(x + 2)^2$

44.  $(2x - y)(x + 1)$

45.  $(2x - 1)(x^2 + 4)$

46.  $4(2x - y)(2x + y)$

47.  $x^2(x - 4)$

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

49.  $(x + 5)(3x - 4)$

50. **prime**

51.  $x = -3, -1$

52.  $x = -4, 0, 7$

53.  $x = -\frac{5}{3}, 2$

54.  $x = -4, -\frac{1}{8}$

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

56.  $x = -8$

57.  $x = -\frac{3}{2}$

58.  $x = \frac{2}{3}$

59.  $\frac{x - 3}{x + 3}$

60.  $\frac{2(x + 2)}{x - 3}$

61. 1

62. 1

63. 2

64.  $\frac{1}{x + 5}$

65. (1, 4)

66.  $\left(-\frac{91}{19}, -\frac{32}{19}\right)$

67.  $\left(\frac{19}{5}, -\frac{6}{5}\right)$

68. (2, -1)

69. (47,18)
70. no solution
71.  $x = -2, \frac{4}{3}$
72.  $x = -1 \pm \sqrt{3}$
73.  $x = -\frac{5}{2}, \frac{3}{2}$
74. no real solutions
75.  $x = -1 \pm \sqrt{7}$
76.  $x = 2 \pm \sqrt{11}$
77.  $x = -3 \pm \sqrt{11}$
78.  $x = \pm 8$
79. \$23.00
80. \$250.50
81.  $30^\circ, 90^\circ,$  and  $60^\circ$
82. a. 8.8 gallons    b. 2031
83.  $23^\circ$  and  $67^\circ$
84.  $47.5^\circ$  and  $132.5^\circ$
85. The  $38^\circ, 114^\circ,$  and  $28^\circ$
86. 19 cm by 11 cm
87. 100 miles
88. 150 student tickets for \$12 each and 50 of the \$18 tickets were sold.
89. 62.5 liters of 12% solution and 37.5 liters of 20%.
90. 175 pounds of almonds and 75 pounds of cashews
91.  $3w^2 - w = 30$ ;  $3\frac{1}{3}$  feet by 9 feet
92.  $w^2 + (w + 7)^2 = 13^2$ ; 5 feet by 12 feet
93.  $x^2 + 12^2 = (x + 8)^2$ ; The hypotenuse is 13 meters long and the other leg of the triangle is 5 meters long.