

Elementary Algebra Review for Exam 4

Solve the equation.

1) $(x - 7)(x + 6) = 0$

2) $(11 - 0.8x)(5 - 0.2x) = 0$

3) $a^2 - 12a + 32 = 0$

4) $x^2 + 3x - 88 = 0$

5) $x^2 - x = 72$

6) $16k^2 - 25 = 0$

7) $4x^2 = 5x$

8) $(x + 4)(x - 7) = -10$

Solve the problem.

9) A room has a floor **area** of 308 square feet. The length is 8 feet more than the width. Find the length and width of the room.

10) One leg of a right triangle is 6 cm shorter than the other leg. The length of the hypotenuse is 30 cm. Find the length of the shorter leg.

11) In a sports league of n teams in which each team plays every other team twice, the total number N of games to be played is given by $N = n^2 - n$. How many teams are in a softball league if the total number of games played is 56?

12) If an object is propelled upward from a height of 96 feet at an initial velocity of 80 feet per second, then its height after t seconds is given by the equation $h = -16t^2 + 80t + 96$, where h is in feet. After how many seconds will the object reach a height of 196 feet?

13) A 10-ft ladder is leaning against a building. If the bottom of the ladder is 6 ft from the base of the building, how high does the ladder reach?

List all numbers for which the rational expression is undefined.

14) $\frac{9}{a - 7}$

15) $\frac{x^2 - 25}{x^2 + 12x + 32}$

16) $\frac{x^2 - 49}{x^2 - 3x - 40}$

Simplify, if possible.

17) $\frac{28m^6p^2}{4m^9p}$

18) $\frac{8x + 24}{10x + 30}$

19) $\frac{-4x + 12}{-8x}$

20) $\frac{b - a}{3a - 3b}$

21) $\frac{7t - 14}{2 - t}$

22) $\frac{3x + 3}{15x^2 + 21x + 6}$

23) $\frac{y^2 - 6y - 16}{y^2 - 5y - 24}$

24) $\frac{a^2 - 36}{a^2 + 10a + 24}$

Multiply and, if possible, simplify.

25) $\frac{3x^2}{4} \cdot \frac{28}{x^3}$

26) $\frac{2x^2 - 98}{4x^2 - 4} \cdot \frac{7x - 7}{14x + 98}$

27) $\frac{m^2 - 16}{8m} \cdot \frac{m^2}{m^2 + 2m - 24}$

28) $\frac{5x + 10}{x - 1} \cdot \frac{3x^2 - 6x + 3}{x^2 - 4}$

29) $\frac{x - 7}{(x + 3)^2} \cdot \frac{x^2 - 4x - 21}{(x - 7)^2}$

30) $\frac{x^2 + 3x - 4}{5x^3 - 3x^2} \cdot \frac{25x^3 - 9x}{3x - 3}$

31) $\frac{k^2 + 8k + 12}{k^2 + 13k + 42} \cdot \frac{k^2 + 7k}{k^2 + 6k + 8}$

Divide and, if possible, simplify.

32) $\frac{2x^2}{5} \div \frac{x^3}{15}$

33) $\frac{12x^{10}}{12y^9} \div \frac{8x^4}{12y^5}$

34) $\frac{9}{y - x} \div \frac{3}{x - y}$

35) $\frac{3p - 3}{p} \div \frac{5p - 5}{2p^2}$

36) $\frac{z^2 + 15z + 54}{z^2 + 16z + 63} \div \frac{z^2 + 6z}{z^2 + 12z + 35}$

37) $(y + 5) \div \frac{3y^2 + 10y - 25}{y^2 + 8y + 15}$

Perform the indicated operation. Simplify, if possible.

38) a) $\frac{4}{12x} + \frac{7}{12x}$

b) $\frac{4m}{m - 3} + \frac{-12}{m - 3}$

c) $\frac{m^2 - 6m}{m - 2} + \frac{8}{m - 2}$

d) $\frac{x^2 - 10x}{x^2 + 12x + 36} + \frac{9x - 42}{x^2 + 12x + 36}$

39) a) $\frac{13}{q - 9} - \frac{11}{q - 9}$

b) $\frac{3a + 15}{a - 5} - \frac{2a + 7}{a - 5}$

c) $\frac{3x + 18}{x^2 + 2x - 24} - \frac{x + 6}{x^2 + 2x - 24}$

40) $\frac{4}{x} + \frac{7}{4x}$

41) $\frac{3}{10x} + \frac{9}{14x^2}$

42) $\frac{z + 11}{2z} - \frac{z - 8}{5z}$

43) $\frac{6x + 2y}{3x^2y} - \frac{4x - 6y}{xy^2}$

44) $\frac{3}{x + 3} - \frac{3}{x - 3}$

45) $\frac{6}{x + 4} + \frac{2}{x}$

Solve. If no solution exists, state this.

46) $\frac{6}{5} - \frac{9}{10} = \frac{1}{x}$

47) $x + \frac{-14}{x} = 5$

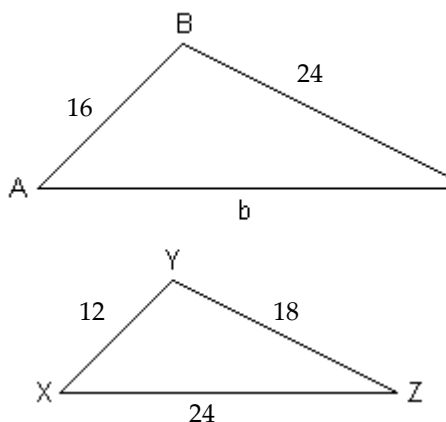
48) $\frac{3}{2t} + \frac{7}{t} = 1$

49) $\frac{x-8}{x+5} = \frac{5}{6}$

50) $\frac{1}{x+1} = \frac{3}{x-6}$

Solve the problem.

- 51) For the pair of similar triangles, find the value of b.

**Solve.**

- 52) To determine the number of deer in the Great Gulf Wilderness, a game warden catches and tags 318 deer and then lets them loose. Later, 168 deer are caught; 56 of them have tags. Estimate the number of deer in the preserve.

Provide an appropriate response.

- 53) Describe the three possible outcomes when graphing a system of equations, and include the number of solutions that each system has.

Decide whether or not the ordered pair is a solution of the system.

- 54) a)
- $(4, -5)$
-
- $4x + y = 11$
-
- $3x + 4y = -8$

Solve the system of equations by graphing. If there is no solution or an infinite number of solutions, state this.

55) $2x + y = 10$
 $x + 2y = 14$

56) $y = \frac{1}{3}x + 2$
 $x - 3y = 7$

57) $3x - y = 5$
 $6x = 2y + 10$

Solve the system using the substitution method. If there is no solution or an infinite number of solutions, state this.

58) $y = 2x - 8$
 $-3x + y = -2$

59) $x - 7y = -49$
 $-7x - 6y = -42$

60) $y - 3x = 8$
 $3y - x = 7$

61) $x + y = 9$
 $x + y = 7$

Solve the system using the elimination method. If there is no solution or an infinite number of solutions, state this.

62) $x - 4y = 9$
 $2x - 4y = 14$

63) $x - 3y = -7$
 $4y = 7x - 36$

64) $-2x - 6y = 4$
 $-4x - 12y = 8$

65) $-4x + 5y = -2$
 $-12x + 15y = 6$

Solve the problem.

- 66) The sum of two angles is
- 194°
- . One angle is
- 22°
- less than twice the other. Find the angles.

- 67) Two angles are supplementary (they sum to 180°), and one is 40° more than three times the other. Find the measure of each angle.

Solve.

- 68) One rental agency rents a van for \$27.00 per day plus \$0.16 per mile. A competitor rents a truck for \$18.00 per day plus \$0.18 per mile. For what mileage is the cost the same for renting the van one day?

- 69) Ron and Kathy are ticket sellers at their class play, Ron selling student tickets for \$2.00 each and Kathy selling adult tickets for \$4.50 each. If their total income for 364 tickets was \$1175.50, then how many of each type of ticket was sold?

- 70) In a local high school basketball game, the winning team scored 57 of their points on a combination of 23 two- and three-pointers. How many shots of each type did the team make?

- 71) Don runs a charity fruit sale, selling boxes of oranges for \$11 and boxes of grapefruit for \$10. If he sold a total of 762 boxes and his total income was \$8125, then how many boxes of oranges did he sell?

Solve the problem.

- 72) Ellen wishes to mix candy worth \$1.40 per pound with candy worth \$3.00 per pound to form 24 pounds of a mixture worth \$2.40 per pound. How many pounds of each type of candy should she use?
- 73) For small jobs, a contractor mixes concrete with 9% cement and concrete with 10.8% cement. How many bags of each should be used if the contractor needs 18 bags of concrete with 10% cement?

Simplify. Do not use negative exponents in your answer.

74) a) $y^7 \cdot y^{-2}$ b) $3^{-8} \cdot 3^{-6}$

75) a) $\left(\frac{c}{3}\right)^{-5}$ b) $\frac{3x^{-4}}{y^{-7}z^{-2}}$

76) a) $\frac{p^4}{p^{-5}}$ b) $\frac{z^{-8}}{z^{-4}}$ c) $\frac{7x^{-6}}{y^{-2}z^3}$

Solve the problem.

- 77) An employee earned \$33,956 this year. This was a raise of 4% over last year. What was his salary last year?
- 78) In a local election, 27,896 people voted. This was a **decrease** of 12% over the last election. How many people voted in the last election?

Solve the equation.

79) $\frac{2}{5}x - \frac{1}{3}x = 4$

80) $\frac{1}{3}x + 3x = -10$

81) $-4x + 2(-3x - 6) = -15 - 7x$

Find the intercepts, then graph the equation.

82) $-2x + 5y = 10$

Find the following.

- 83) a) Find the slope of the line containing the points $(-2, -6)$ and $(8, -11)$.
- b) Write the slope-intercept equation of the line containing the points given in part a).

Answer Key

Testname: EAREVIEW4_SPRING2012

- 1) 7, -6
- 2) 13.75, 25
- 3) 8, 4
- 4) -11, 8
- 5) -8, 9
- 6) $\frac{5}{4}, -\frac{5}{4}$
- 7) $\frac{5}{4}, 0$
- 8) -3, 6
- 9) 14 feet, 22 feet
- 10) 18 cm
- 11) 8
- 12) 2.5 sec
- 13) 8 ft
- 14) $a = 7$
- 15) $x = -8$ and -4
- 16) $x = -5$ and 8
- 17) $\frac{7p}{m^3}$
- 18) $\frac{4}{5}$
- 19) $\frac{x-3}{2x}$
- 20) $-\frac{1}{3}$
- 21) -7
- 22) $\frac{1}{5x+2}$
- 23) $\frac{y+2}{y+3}$
- 24) $\frac{a-6}{a+4}$
- 25) $\frac{21}{x}$
- 26) $\frac{x-7}{4(x+1)}$
- 27) $\frac{m(m+4)}{8(m+6)}$
- 28) $\frac{15(x-1)}{x-2}$
- 29) $\frac{1}{x+3}$
- 30) $\frac{(x+4)(5x+3)}{3x}$
- 31) $\frac{k}{k+4}$
- 32) $\frac{6}{x}$
- 33) $\frac{3x^6}{2y^4}$
- 34) -3
- 35) $\frac{6p}{5}$
- 36) $\frac{z+5}{z}$
- 37) $\frac{(y+5)(y+3)}{3y-5}$
- 38) a) $\frac{11}{12x}$ b) 4
c) $m-4$ d) $\frac{x-7}{x+6}$
- 39) a) $\frac{2}{q-9}$ b) $\frac{a+8}{a-5}$ c) $\frac{2}{x-4}$
- 40) $\frac{23}{4x}$
- 41) $\frac{21x+45}{70x^2}$
- 42) $\frac{3z+71}{10z}$
- 43) $\frac{-12x^2+24xy+2y^2}{3x^2y^2}$
- 44) $\frac{-18}{x^2-9}$
- 45) $\frac{8x+8}{x(x+4)}$
- 46) $\frac{10}{3}$
- 47) -2, 7
- 48) $\frac{17}{2}$
- 49) 73
- 50) $-\frac{9}{2}$
- 51) 32

Answer Key

Testname: EAREVIEW4_SPRING2012

52) 954 deer

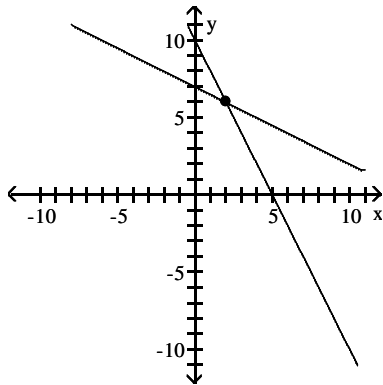
53) (1) The graphs intersect at one point, and the system has one solution.

(2) The graphs are parallel, and the system has no solution.

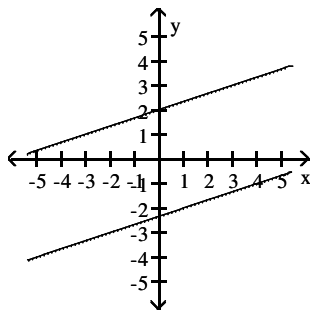
(3) The equations have the same graph, and the system has an infinite number of solutions.

54) Yes

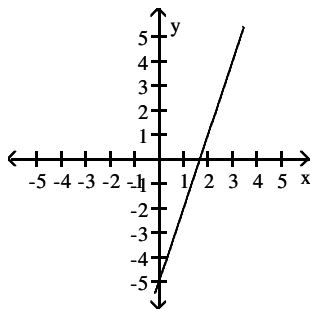
55) (2, 6)



56) No solution



57) Infinite number of solutions



58) (-6, -20)

59) (0, 7)

60) $\left(-\frac{17}{8}, \frac{13}{8}\right)$

61) No solution

62) (5, -1)

63) (8, 5)

64) Infinite number of solutions

65) No solution

66) 72° and 122°

67) 35° , 145°

68) 450

69) 185 student tickets

179 adult tickets

70) Two-pointers: 12; three-pointers: 11

71) 505 boxes

72) 15 pounds of \$3.00 candy

9 pounds of \$1.40 candy

73) 10 bags of 10.8% cement

8 bags of 9% cement

74) a) y^5 b) $\frac{1}{3^{14}}$

75) a) $\frac{3^5}{c^5}$ or $\frac{243}{c^5}$ b) $\frac{3y^7z^2}{x^4}$

76) a) p^9 b) $\frac{1}{z^4}$ c) $\frac{7y^2}{x^6z^3}$

77) \$32,650

78) 31,700 people

79) 60

80) -3

81) 1

82) (-5, 0), (0, 2)

83) a) $-\frac{1}{2}$

b) $y = -\frac{1}{2}x - 7$