

Name \_\_\_\_\_

Math 81  
Final Exam Review

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

**Solve the equation.**

1)  $9x - (3x + 30) = 12$

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

2)  $13 - 6(x + 3) = 12 - 5(x + 4)$

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

3)  $\frac{x + 6}{2} + \frac{x - 2}{3} = \frac{19}{6}$

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

4)  $1.4x - 4.8 = 0.8x - 0.9$

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

**Solve the equation. Use words or set notation to identify equations that have no solution, or equations that are true for all real numbers.**

5)  $5x + 8 - 6x - 9 = 6x - 7x - 4$

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

**Use the given information to write an equation. Let  $x$  represent the number described in the exercise. Then solve the equation and find the number.**

6) When 4 times a number is subtracted from 7 times the number, the result is 21. Find the number.

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

**Solve the formula for the specified variable.**

7)  $d = rt$  for  $t$

7) \_\_\_\_\_

**Use the percent formula,  $A = PB$ : A is P percent of B, to solve.**

8) 21 is 2% of what number?

8) \_\_\_\_\_

**Solve the problem.**

9) A promotional deal for long distance phone service charges a \$15 basic fee plus \$0.05 per minute for all calls. If Joe's phone bill was \$64 under this promotional deal, how many minutes of phone calls did he make? Round to the nearest integer, if necessary.

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

**Solve.**

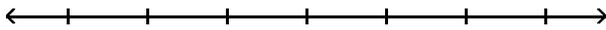
- 10) A rectangular carpet has a perimeter of 162 inches. The length of the carpet is 63 inches more than the width. What are the dimensions of the carpet? 10) \_\_\_\_\_

**Express the solution set of the inequality in interval notation.**

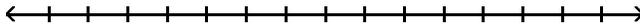
- 11)  $x \geq -18$  11) \_\_\_\_\_

**Use both the addition and multiplication properties of inequality to solve the inequality. Graph the solution set on a number line.**

- 12)  $21x - 24 > 3(6x - 9)$  12) \_\_\_\_\_

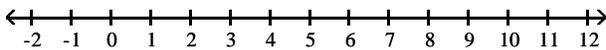


- 13)  $6 - 3x \geq -18$  13) \_\_\_\_\_



**Solve the compound inequality and graph the solution set on a number line. Except for the empty set, express the solution set in interval notation.**

- 14)  $5 \leq 3x - 4 \leq 11$  14) \_\_\_\_\_



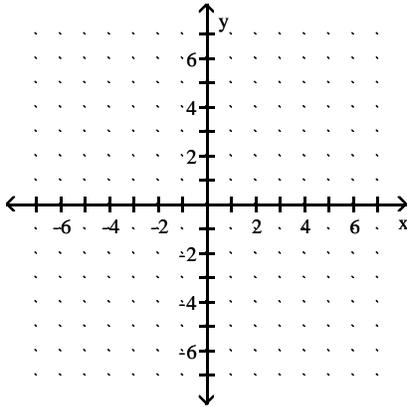
**Solve the problem.**

- 15) Claire has received scores of 85, 88, 87, and 85 on her algebra tests. What is the minimum score she must receive on the fifth test to have an overall test score average of at least 88? (Hint: The average of a list of numbers is their sum divided by the number of numbers in the list.) 15) \_\_\_\_\_

Graph the linear equation in two variables.

16)  $y = \frac{1}{5}x - 5$

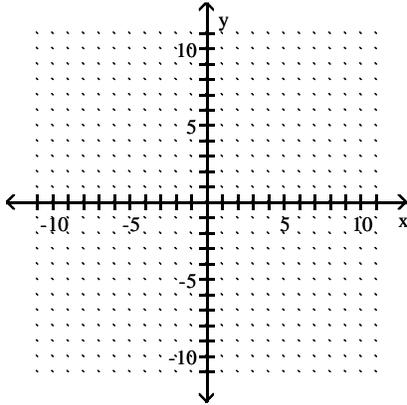
16) \_\_\_\_\_



Find the y- and x-intercepts for the equation. Then graph the equation.

17)  $-4x - 8y = 16$

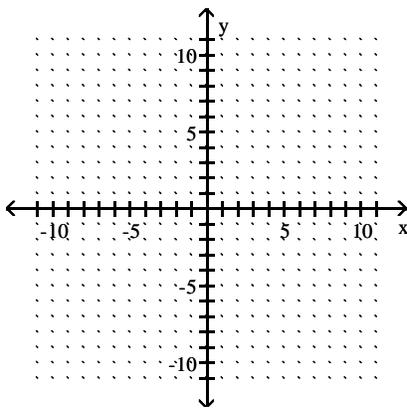
17) \_\_\_\_\_



Graph the equation.

18)  $y = -9$

18) \_\_\_\_\_



Find the slope of the line passing through the pair of points or state that the slope is undefined.

19)  $(7, -7)$  and  $(1, -4)$

19) \_\_\_\_\_

Determine whether the lines through each pair of points are parallel, perpendicular, or neither.

20)  $(-2, -8)$  and  $(-4, -12)$ ;  $(-6, -6)$  and  $(-8, -5)$

20) \_\_\_\_\_

Find the slope of the line.

21)  $3x - 8y = 26$

21) \_\_\_\_\_

Find the slope.

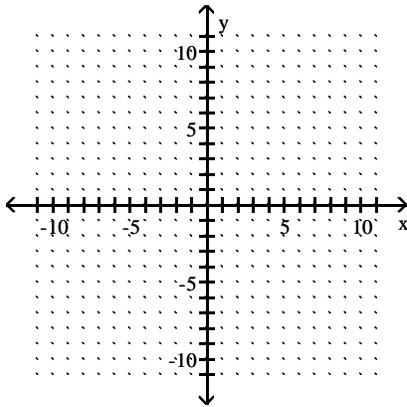
22) Find the slope of a line perpendicular to the line  $-6x + 3y = -8$ .

22) \_\_\_\_\_

Put the equation in slope-intercept form by solving for  $y$ . Use the slope and  $y$ -intercept to graph the equation.

23)  $5x + 2y = 10$

23) \_\_\_\_\_



Find the point-slope form of the equation of the line satisfying the given conditions and use this to write the slope-intercept form of the equation.

24) Slope =  $-\frac{5}{4}$ , passing through  $(-8, 2)$

24) \_\_\_\_\_

Write an equation in slope-intercept form of the line satisfying the given conditions.

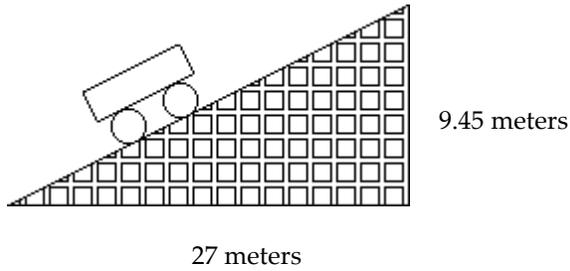
25) Parallel to the line  $y = -4x - 1$ ; containing the point  $(2, 6)$

25) \_\_\_\_\_

Solve.

- 26) A section of roller coaster track has the dimensions shown in the diagram. Find the grade of the track, which is the slope written as a percent.

26) \_\_\_\_\_



Determine whether the ordered pair is a solution of the system.

- 27)  $(-3, 2)$   
$$\begin{cases} 4x + y = -14 \\ 2x + 4y = -14 \end{cases}$$

27) \_\_\_\_\_

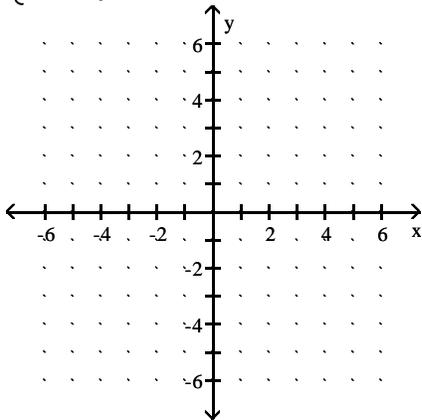
- 28)  $(4, 6)$   
$$\begin{cases} 3x = 18 - y \\ 2x = 26 - 3y \end{cases}$$

28) \_\_\_\_\_

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

- 29) 
$$\begin{cases} 3x + 5y = 25 \\ 2x - 2y = 6 \end{cases}$$

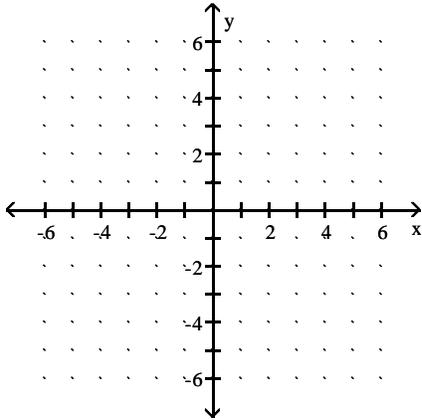
29) \_\_\_\_\_



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

$$30) \begin{cases} 2x + y = 3 \\ 2x + y = 2 \end{cases}$$

30) \_\_\_\_\_



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.

$$31) \begin{cases} x - 5y = 14 \\ 3x - 6y = 15 \end{cases}$$

31) \_\_\_\_\_

$$32) \begin{cases} \frac{1}{3}x + \frac{1}{3}y = 0 \\ x - y = -6 \end{cases}$$

32) \_\_\_\_\_

$$33) \begin{cases} 4x + y = 11 \\ 16x + 4y = 44 \end{cases}$$

33) \_\_\_\_\_

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.

$$34) \begin{cases} x + y = 14 \\ x - y = 2 \end{cases}$$

34) \_\_\_\_\_

$$35) \begin{cases} 2x + 12y = -70 \\ 8x + 4y = 28 \end{cases}$$

35) \_\_\_\_\_

36) 
$$\begin{cases} 7x + 6y = 34 \\ 5x - 4y = -42 \end{cases}$$

36) \_\_\_\_\_

37) 
$$\begin{cases} 2x - 8y = 3 \\ -4x + 16y = -12 \end{cases}$$

37) \_\_\_\_\_

**Solve the system by the best method. Use set notation to express the solution set.**

38) 
$$\begin{cases} 2x - 7y = 26 \\ 4x + 7y = 10 \end{cases}$$

38) \_\_\_\_\_

39) 
$$\begin{cases} x + 5y = -26 \\ -6x + 4y = -82 \end{cases}$$

39) \_\_\_\_\_

**Solve the problem.**

40) The radiator in a certain make of car needs to contain 40 liters of 40% antifreeze. The radiator now contains 40 liters of 20% antifreeze. How many liters of this solution must be drained and replaced with 100% antifreeze to get the desired strength?

40) \_\_\_\_\_

41) A twin-engined aircraft can fly 1216 miles from city A to city B in 4 hours with the wind and make the return trip in 8 hours against the wind. What is the speed of the wind?

41) \_\_\_\_\_

**Add the polynomials.**

42)  $(-6x^3 + 6x + 9) + (-8x^2 + 4x + 2)$

42) \_\_\_\_\_

**Subtract the polynomials.**

43)  $(4x^5 + 9x^4 + 17) - (-6x^4 + 7x^5 + 13)$

43) \_\_\_\_\_

**Multiply the monomials.**

44)  $(-5x^5)(8x^4)$

44) \_\_\_\_\_

**Simplify the expression using the products-to-powers rule.**

45)  $(-4x^7)^2$

45) \_\_\_\_\_

**Find the product.**

46)  $(x^2 - 2x + 1)(8x)$

46) \_\_\_\_\_

47)  $(2x + 5)(x + 12)$

47) \_\_\_\_\_

48)  $(8x - 1)(x^2 - 2x + 1)$

48) \_\_\_\_\_

**Multiply using the rule for finding the product of the sum and difference of two terms.**

49)  $(7x + 2)(7x - 2)$

49) \_\_\_\_\_

**Multiply by using the rule for the square of a binomial.**

50)  $(4x - 5)^2$

50) \_\_\_\_\_

**Divide the monomials.**

51)  $\frac{-36x^{10}y^9}{9x^4y^6}$

51) \_\_\_\_\_

**Divide the polynomial by the monomial.**

52)  $\frac{18x^9 - 12x^6 + 9x^4}{3x^4}$

52) \_\_\_\_\_

**Divide as indicated.**

53)  $\frac{25x^3 + 10x^2 + 2x - 1}{5x - 1}$

53) \_\_\_\_\_

**Simplify the exponential expression.**

54)  $(4x^2)^3 x^{-15}$

54) \_\_\_\_\_

**Use the zero-exponent rule to simplify the expression.**

55)  $3y^0$

55) \_\_\_\_\_

**Factor out the GCF from the polynomial.**

56)  $21y^3 - 6y^2 + 12y$

56) \_\_\_\_\_

**Factor by grouping.**

57)  $x^3 - x^2 + 8x - 8$

57) \_\_\_\_\_

**Factor completely.**

58)  $x^2 - x - 40$

58) \_\_\_\_\_

59)  $5x^2 - 5x - 30$

59) \_\_\_\_\_

**Factor completely.**

60)  $10y^2 + 21y + 9$

60) \_\_\_\_\_

**Factor completely. If unfactorable, indicate that the polynomial is prime.**

61)  $49x^2 - 64$

61) \_\_\_\_\_

62)  $6x^7 - 6x^5$

62) \_\_\_\_\_

63)  $9x^2 - 30xy + 25y^2$

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

**Factor completely.**

64)  $t^3 + 125$

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

65)  $x^3 - 64$

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

66)  $27p^3 - 1$

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

**Solve the equation.**

67)  $x^2 + 5x - 36 = 0$

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

68)  $x^2 - 81 = 80x$

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

**Solve the problem.**

69) An object is thrown upward from the top of a 160-foot building with an initial velocity of 48 feet per second. The height  $h$  of the object after  $t$  seconds is given by the quadratic equation  $h = -16t^2 + 48t + 160$ . When will the object hit the ground?

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

Find all values that make the rational expression undefined. If the rational expression is defined for all real numbers, so state.

70)  $\frac{4y - 5}{y^2 - 25}$

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

Simplify the rational expression. If the rational expression cannot be simplified, so state.

71)  $\frac{x + 7}{x^2 + 5x - 14}$

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

72)  $\frac{8 - x}{x - 8}$

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

Multiply. Simplify if possible.

73)  $\frac{k^2 + 6k + 8}{k^2 + 10k + 16} \cdot \frac{k^2 + 8k}{k^2 - 5k - 36}$

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

Divide. Simplify if possible.

74)  $\frac{x^2 + 12x + 35}{x^2 + 14x + 49} \div \frac{x^2 + 5x}{x^2 + 3x - 28}$

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

Perform the indicated operation. Simplify if possible.

75)  $\frac{x^2 - 9x}{x - 6} + \frac{18}{x - 6}$

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

Perform the indicated operation(s). Simplify if possible.

76)  $\frac{5x + 2y}{2} - \frac{5x - 2y}{2}$

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

77)  $\frac{2}{x + 5} - \frac{7}{9x + 45}$

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

78)  $\frac{x - 4}{x^2 + 7x + 6} + \frac{2x + 5}{x^2 + 8x + 12}$

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

**Simplify the complex fraction.**

$$79) \frac{\frac{x}{3}}{\frac{4}{x+7}}$$

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

**Simplify the complex rational expression.**

$$80) \frac{\frac{x}{36} - \frac{1}{x}}{1 + \frac{6}{x}}$$

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

**Solve the rational equation.**

$$81) \frac{6}{x} + \frac{1}{8} = \frac{4}{x}$$

81) \_\_\_\_\_

$$82) \frac{x-6}{5} = \frac{x+4}{6}$$

82) \_\_\_\_\_

$$83) \frac{1}{x-5} = \frac{10}{x^2-25}$$

83) \_\_\_\_\_

**Solve the problem.**

84) A flagpole casts a shadow of 21 ft. Nearby, a 10-ft tree casts a shadow of 3 ft. What is the height of the flag pole?

84) \_\_\_\_\_

85) BJ can overhaul a boat's diesel inboard engine in 20 hours. His apprentice takes 60 hours to do the same job. How long would it take them working together assuming no gain or loss in efficiency?

85) \_\_\_\_\_