Name_____ Math 81
Final Exam Review (Fall 2012)

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.

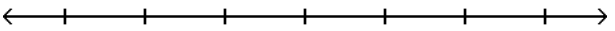
10) A rectangular carpet has a perimeter of 162 inches. The length of the carpet is 63 inches more than the width. What are the dimensions of the carpet? 10) _____

Express the solution set of the inequality in interval notation.

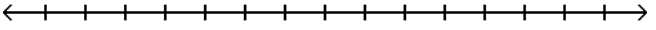
11) $x \geq -18$ 11) _____

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) _____

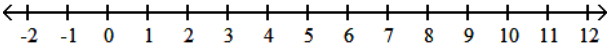


13) $6 - 3x \geq -18$ 13) _____



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) _____

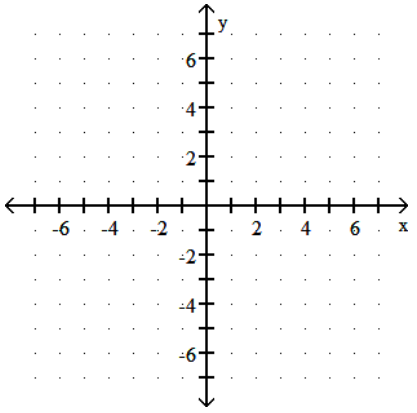



Solve the problem.

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) _____

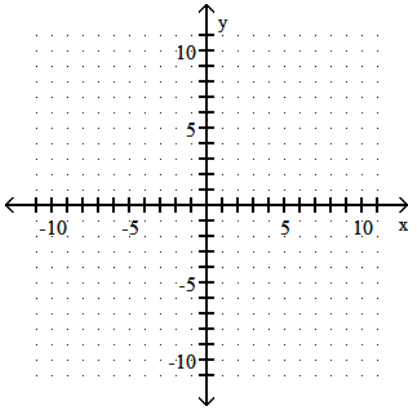
Graph the linear equation in two variables.

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



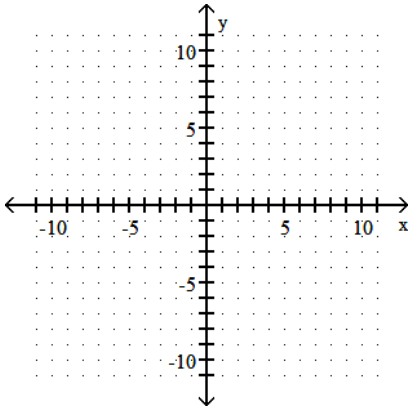

Find the y- and x-intercepts for the equation. Then graph the equation.

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.

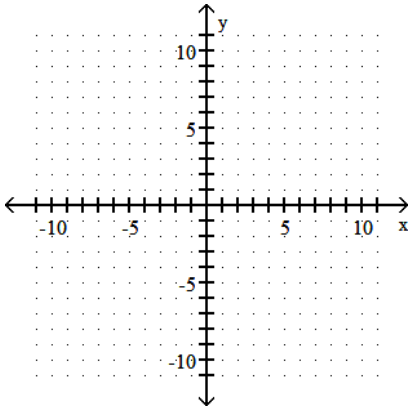
21) $3x - 8y = 26$ 21) _____

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.

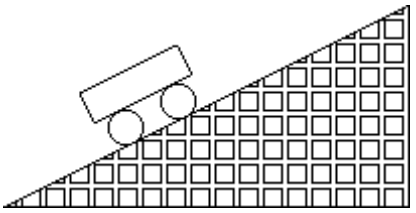
24) Slope = $-\frac{5}{4}$, passing through (-8, 2) 24) _____

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) _____



9.45 meters

27 meters

Find the indicated function value.

27) Find f(-4) when $f(x) = 5x^2 - 2x - 1$. 27) _____

Find the domain and range.

28) {(1,-3), (-11,-9), (-12,-6), (4,-1), (-7,-4)} 28) _____

Decide whether the relation is a function.

29) {(-6, -1), (-2, 1), (3, -8), (3, -7)} 29) _____

30) Women's Shoe Sizes 30) _____

| USA | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|
| Japan | 20 | 21 | 22 | 23 | 24 | 25 | 26 |

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

31) (-3, 2) 31) _____

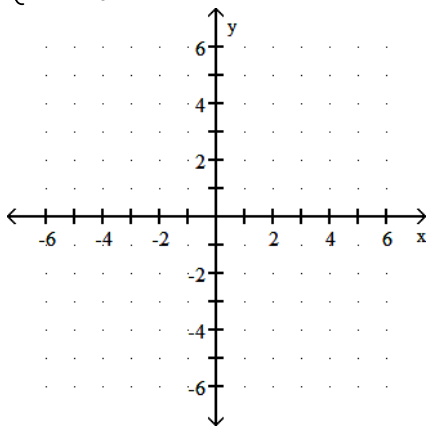
$$\begin{cases} 4x + y = -14 \\ 2x + 4y = -14 \end{cases}$$

32) (4, 6) 32) _____

$$\begin{cases} 3x = 18 - y \\ 2x = 26 - 3y \end{cases}$$

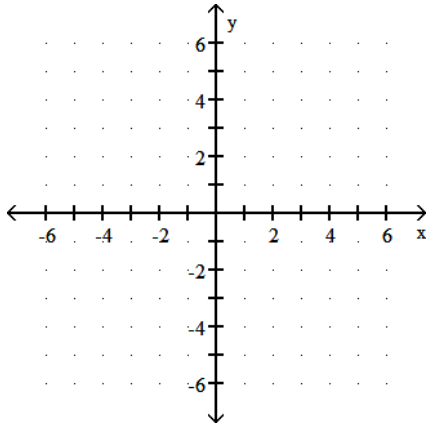
Solve the system by the graphing method. If there is no solution or an infinite number of solutions, so state.

33) $\begin{cases} 3x + 5y = 25 \\ 2x - 2y = 6 \end{cases}$ 33) _____




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.

34) $\begin{cases} 2x + y = 3 \\ 2x + y = 2 \end{cases}$ 34) _____




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.

35) $\begin{cases} x - 5y = 14 \\ 3x - 6y = 15 \end{cases}$ 35) _____

36) $\begin{cases} \frac{1}{3}x + \frac{1}{3}y = 0 \\ x - y = -6 \end{cases}$ 36) _____

37) $\begin{cases} 4x + y = 11 \\ 16x + 4y = 44 \end{cases}$ 37) _____

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.

38) $\begin{cases} x + y = 14 \\ x - y = 2 \end{cases}$ 38) _____

39) $\begin{cases} 2x + 12y = -70 \\ 8x + 4y = 28 \end{cases}$ 39) _____

40) $\begin{cases} 7x + 6y = 34 \\ 5x - 4y = -42 \end{cases}$ 40) _____

41) $\begin{cases} 2x - 8y = 3 \\ -4x + 16y = -12 \end{cases}$ 41) _____

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

42) $\begin{cases} 2x - 7y = 26 \\ 4x + 7y = 10 \end{cases}$ 42) _____

43) $\begin{cases} x + 5y = -26 \\ -6x + 4y = -82 \end{cases}$ 43) _____

Solve the problem.

44) 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? 44) _____

45) 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? 45) _____

Add the polynomials.

46) $(-6x^3 + 6x + 9) + (-8x^2 + 4x + 2)$ 46) _____

Subtract the polynomials.

47) $(4x^5 + 9x^4 + 17) - (-6x^4 + 7x^5 + 13)$ 47) _____

Multiply the monomials.

48) $(-5x^5)(8x^4)$ 48) _____

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

49) $(-4x^7)^2$ 49) _____

Find the product.

50) $(x^2 - 2x + 1)(8x)$ 50) _____

51) $(2x + 5)(x + 12)$ 51) _____

52) $(8x - 1)(x^2 - 2x + 1)$ 52) _____

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

53) $(7x + 2)(7x - 2)$ 53) _____

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

54) $(4x - 5)^2$ 54) _____

Divide the monomials.

55) $\frac{-36x^{10}y^9}{9x^4y^6}$ 55) _____

Divide the polynomial by the monomial.

56) $\frac{18x^9 - 12x^6 + 9x^4}{3x^4}$ 56) _____

Divide as indicated.

57) $\frac{25x^3 + 10x^2 + 2x - 1}{5x - 1}$ 57) _____

Simplify the exponential expression.

58) $(4x^2)^3x^{-15}$ 58) _____

Use the zero-exponent rule to simplify the expression.

59) $3y^0$ 59) _____

Factor out the GCF from the polynomial.

60) $21y^3 - 6y^2 + 12y$ 60) _____

Factor by grouping.

61) $x^3 - x^2 + 8x - 8$ 61) _____

Factor completely.

62) $x^2 - x - 40$ 62) _____

63) $5x^2 - 5x - 30$ 63) _____

Factor completely.

64) $10y^2 + 21y + 9$ 64) _____

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

65) $49x^2 - 64$ 65) _____

66) $9x^2 - 30xy + 25y^2$ 66) _____

Factor completely.

67) $t^3 + 125$ 67) _____

68) $x^3 - 64$ 68) _____

Solve the equation.

69) $x^2 + 5x - 36 = 0$ 69) _____

70) $x^2 - 81 = 80x$ 70) _____

Solve the problem.

71) 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? 71) _____

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

72) $\frac{4y - 5}{y^2 - 25}$ 72) _____

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

73) $\frac{x + 7}{x^2 + 5x - 14}$ 73) _____

74) $\frac{8 - x}{x - 8}$ 74) _____

Multiply. Simplify if possible.

75) $\frac{k^2 + 6k + 8}{k^2 + 10k + 16} \cdot \frac{k^2 + 8k}{k^2 - 5k - 36}$ 75) _____

Divide. Simplify if possible.

76) $\frac{x^2 + 12x + 35}{x^2 + 14x + 49} \div \frac{x^2 + 5x}{x^2 + 3x - 28}$ 76) _____

Perform the indicated operation. Simplify if possible.

77) $\frac{x^2 - 9x}{x - 6} + \frac{18}{x - 6}$ 77) _____

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

78) $\frac{5x + 2y}{2} - \frac{5x - 2y}{2}$ 78) _____

79) $\frac{2}{x+5} - \frac{7}{9x+45}$ 79) _____

80) $\frac{x-4}{x^2+7x+6} + \frac{2x+5}{x^2+8x+12}$ 80) _____

Simplify the complex fraction.

81) $\frac{\frac{x}{3}}{\frac{4}{x+7}}$ 81) _____

Simplify the complex rational expression.

82) $\frac{\frac{x}{36} - \frac{1}{x}}{1 + \frac{6}{x}}$ 82) _____

Solve the rational equation.

83) $\frac{6}{x} + \frac{1}{8} = \frac{4}{x}$ 83) _____

84) $\frac{x-6}{5} = \frac{x+4}{6}$ 84) _____

85) $\frac{1}{x-5} = \frac{10}{x^2-25}$ 85) _____

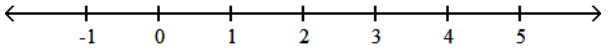
Solve the problem.

86) 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? 86) _____

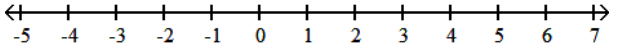
87) BJ can overhaul a boat's diesel inboard engine in 20 hours. His apprentice takes 60 hours to do the same job. How long would it take them working together assuming no gain or loss in efficiency? 87) _____

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.

88) $-3x \leq -9$ or $3x > 9x - 6$ 88) _____




89) $-8x > -40$ and $x + 8 > 6$ 89) _____



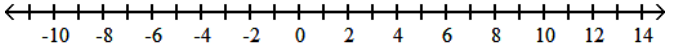

Find the solution set for the equation.

90) $3|x - 3| = 18$ 90) _____

91) $|5x - 9| + 7 = 3$ 91) _____

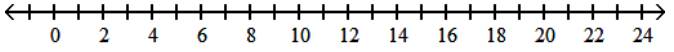
Solve and graph the solution set on a number line. Use interval notation to describe answer set.

92) $|x + 3| > 7$ 92) _____




Solve and graph the solution set on a number line. Use interval notation to describe answer set.

93) $|x - 5| + 3 \leq 8$ 93) _____




Simplify the expression.

94) $\sqrt{9x^4}$ 94) _____

Find the indicated root, or state that the expression is not a real number.

95) $\sqrt[3]{-125}$ 95) _____

Use radical notation to rewrite the expression. Simplify, if possible.

96) $(xy)^{4/5}$ 96) _____

Use properties of rational exponents to simplify the expression. Assume that any variables represent positive numbers.

97) $(16x^6y^4)^{1/2}$ 97) _____

Use the product rule to multiply.

98) $\sqrt[7]{5x^5} \cdot \sqrt[7]{7x}$ 98) _____

Simplify by factoring. Assume that any variable in a radicand represents a positive real number.

99) $\sqrt{125x^3}$ 99) _____

Add or subtract as indicated. You will need to simplify terms to identify like radicals.

100) $2\sqrt[3]{a} + \sqrt[3]{64a}$ 100) _____