This does not need to be turned in, it is only for practice.

If you wish, you can treat this like the Final Exam. Take this under the same conditions that you will be taking the Final Exam (no notes, no books, etc.), then grade yourself and study the sections where you had problems. The Final Exam will be 50 questions.

Good luck!

**Solve the problem.**

1) If a rock falls from a height of 80 meters above the ground, the height H (in meters) after x seconds is approximately \( H = 80 - 4.9x^2 \). What is the height of the rock after 4 seconds?

2) The cost of having a car towed is given by the formula \( C = 3x + 60 \), where \( C \) is in dollars and \( x \) is the number of miles the car is towed. Find the cost of having a car towed 3 miles.

**Solve the equation.**

3) \( 7n - 8 = 20 \)

4) Power is the time rate of doing work and is commonly measured in watts. Power is given by the formula \( P = \frac{W}{t} \), where \( P \) is power, \( W \) is work (in joules), and \( t \) is time in seconds. If 1000 watts of power are used in 18 seconds, how much work (in joules) was done?

5) \( 4(2x - 1) = 16 \)

6) \( \frac{2x}{5} - \frac{x}{3} = 2 \)

**Solve the problem.**

7) Forensic scientists use the lengths of certain bones to calculate the height of a person. When the femur (\( f \)), the bone from the knee to the hip socket is used, the following formula applies for men: \( h = 69.09 + 2.24f \), where \( h \) is the height and \( f \) is the length of the femur. Find the height of a man with a femur measuring 70 centimeters.

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

8) \( P = 2L + 2W \) for \( L \)

**Express the percent as a decimal.**

9) \( 0.026\% \)

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

10) What number is 32% of 10?

**Solve the problem.**

11) 13% of students at a university attended a lecture. If 6000 students are enrolled at the university, about how many students attended the lecture?
The pie chart below shows the number of pizzas consumed by college students in a typical month. Use the chart to answer the question.

12) Find the number of degrees in the 41% sector.

Let $x$ represent the number. Write the English phrase as an algebraic expression.

13) The product of $-9$ and the sum of a number and 12.

Let $x$ represent the number. Use the given conditions to write an equation. Solve the equation and find the number.

14) Three-fourths of a number is $\frac{1}{2}$. Find the number in lowest terms.

Solve the problem.

15) The president of a certain university makes three times as much money as one of the department heads. If the total of their salaries is $250,000, find each worker's salary.

Use a formula for perimeter or area to solve the problem.

16) Find the area of the triangle.

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/\  \\
/  \\
/    \\
14 m 7 m
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Use the formula for the area or circumference of a circle to solve the problem. Where applicable, express answers in terms of $\pi$.

17) Give the exact circumference.

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/\  \\
/  \\
/    \\
28 yd
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Use the relationship among the three angles of any triangle to solve the problem.

18) One of the base angles of an isosceles triangle is $26^\circ$. Find the measures of the other two angles. (An isosceles triangle has two equal base angles.)

Find the indicated angle.

19) Find the supplement of $47^\circ$.

Solve the problem.

20) Find the volume of a cylinder that has a radius of 3 yd and a height of 14 yd. Use 3.14 as an approximation for $\pi$.

Graph the solution of the inequality on a number line.

21) $x \geq 3$
Describe the graph using set-builder notation.

22)

Use the addition property of inequality to solve the inequality. Express the solution set in set-builder notation and graph the set on a number line.

23) \(x - 11 < -7\)

Use the multiplication property of inequality to solve the inequality. Express the solution set in set-builder notation and graph the set on a number line.

24) \(-7 \geq x/4\)

Use both the addition and multiplication properties of inequality to solve the inequality. Express the solution set in set-builder notation and graph the set on a number line.

25) \(-12x - 4 \leq -4(2x - 1)\)

Solve the problem.

26) A certain car has a weight limit for all passengers and cargo of 1041 pounds. The four passengers in the car weigh an average of 155 pounds. Use an inequality to find the maximum weight of the cargo that the car can handle.

Graph the equation.

27) \(y = x^2 - 2\)

Solve the problem.

28) The linear equation in two variables \(y = 118 - 5x\) models the amount of water, \(y\), in ounces, remaining in a leaky bucket \(x\) minutes after the bucket was filled. The equation indicates that the bucket initially contains 118 ounces of water and loses 5 ounces each minute. Find a solution of \(y = 118 - 5x\) using 3 for \(x\).

Use the graph to identify the \(x\)- and \(y\)-intercepts or state that there is no \(x\)- or \(y\)-intercept.

29)

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

30) \(8y - 2x = -10\)

Write an equation for the graph.

31)
32) Find the slope of the line passing through the pair of points or state that the slope is undefined.
   ( -5,  1) and ( 6,  1)

33) Find the slope of the line, or state that the slope is undefined.

34) Determine whether the lines through each pair of points are parallel.
    ( -7,  -1) and ( 3,  -1)
    ( -5,  4) and ( 0,  4)

35) Find the y-intercept.
    -3x  - 4y =  2

36) Put the equation in slope-intercept form by solving for y. Use the slope and y-intercept to graph the equation.
    6x + y =  5

37) Graph both linear equations on the rectangular coordinate system. Decide whether or not the lines are parallel.
    y =  4x  - 1 and y =  4x  - 5

38) Interpret the linear equation.
    When a tow truck is called, the cost of the service is given by the linear function y = 2x + 85, where y is in dollars and x is the number of miles the car is towed. Find and interpret the slope and y-intercept of the linear equation.

39) Find the point-slope form of the line satisfying the given conditions and use this to write the slope-intercept form of the equation.
    Slope =  5/2, passing through (0,  3)

40) Find the point-slope form of the line satisfying the given conditions and use this to write the slope-intercept form of the equation.
    Passing through ( 6,  -13) and ( 2,  -7)

41) Model the problem with a linear equation.
    An investment is worth $ 3320 in 1992. By 1996 it has grown to $4032. Let y be the value of the investment in the year x, where x = 0 represents 1992. Write a linear equation that models the value of the investment in the year x.

42) Decide whether or not the ordered pair is a solution of the system.
    ( 5,  4)
    2x =  -6  -  y
    3x =  -7  - 2y

43) Solve the system by graphing. If there is no solution or an infinite number of solutions, so state.
    x =  -y
    y + x =  6

44) Solve the system by the substitution method.
    9x + 8y =  -56
    -2x  - 4y =  28
Solve the problem.
45) A tour group split into two groups when waiting in line for food at a fast food counter. The first group bought 8 slices of pizza and 6 soft drinks for $39.54. The second group bought 6 slices of pizza and 7 soft drinks for $34.13. How much does one slice of pizza cost?

Solve the system by the addition method. If there is no solution or an infinite number of solutions, so state.
46) \[ x + 8y = 11 \]
\[ -6x + 8y = -10 \]

47) \[ 7x = 5y + 3 \]
\[ 7x = 5y - 7 \]

Solve the system by the best method.
48) \[ x + 9y = 39 \]
\[ 3x + 8y = 22 \]

Solve the problem.
49) Two numbers total 6, and their difference is 12. Find the two numbers.

50) Julie and Eric row their boat (at a constant speed) 63 miles downstream for 7 hours, helped by the current. Rowing at the same rate, the trip back against the current takes 9 hours. Find the rate of the current.

Identify the polynomial as a monomial, binomial, or trinomial. Give the degree of the polynomial.
51) \[ 17x^9 - 3x - 9 \]

Solve.
52) If the cost, \( y \), for manufacturing \( x \) units of a certain product is given by \( y = x^2 - 70x + 1800 \), find the cost of manufacturing 100 units.

Find the product.
53) \( (x - 12)(x + 2) \)

Solve the problem.
54) Find the area of a triangle with a base of 3x inches and a height of \((4x + 2)\) inches.

Use the FOIL method to find the product.
55) \( (2 - 4x)(4 - 4x) \)

Multiply by using the rule for finding the product of the sum and difference of two terms.
56) \( (x^2 + 11)(x^2 - 11) \)

Multiply by using the rule for the square of a binomial.
57) \((8a - 5)^2\)

Find the area of the shaded region. Write the answer as a polynomial in descending powers of \( x \).
58) \( \text{area} = \frac{1}{2} \times \text{base} \times \text{height} \)
Solve.
59) Express the volume of the box as a polynomial in standard form.

![Box diagram](image.png)

Evaluate the polynomial for the given values of x and y.
60) \( x^3 + 3x^2y + 3xy^2 + y^3 \); \( x = 2 \) and \( y = 3 \)

Add or subtract as indicated.
61) \((16x^3y^2 + 3y^4) - (-14x^4 - 8x^2y^2 + 3y^4)\)

Find the product.
62) \(10ab^3(10ab^3 - 9b^5)\)

Divide using the quotient rule.
63) \(\frac{x^{11}y^{12}}{x^2y^3}\)

Use the zero exponent rule to simplify the expression.
64) \(17y^0\)

Simplify the expression using the quotients to powers rule.
65) \(\left(\frac{4x^3}{y^2}\right)^3\)

Divide the polynomial by the monomial.
66) \(\frac{27x^8 + 27x^6 + 12x^2}{3x^2}\)

Divide as indicated.
67) \(\frac{x^2 + 12x + 27}{x + 3}\)

Use synthetic division to divide.
68) \((2x^2 + 17x + 35) \div (x + 5)\)

Write the expression with positive exponents only. Then simplify, if possible.
69) \(-5^{-2}\)

Simplify the expression.
70) \((x - 3y^4)^{-1}\)

Write the number in decimal notation without the use of exponents.
71) \(2.0319 \times 10^{-7}\)

Write the number in scientific notation.
72) \(0.00000033203\)

Perform the indicated computations. Write the result in scientific notation.
73) \((4 \times 10^4)^{-1}\)

Factor out the GCF from the polynomial.
74) \(20m^9 - 8m^4 + 12m^2\)
Factor by grouping.
75) $x^3 - x^2 + 5x - 5$

Factor as completely as possible. If unfactorable, indicate that the polynomial is prime.
76) $x^2 + 3x - 70$

Factor as completely as possible.
77) $x^3 - x^2 - 30x$

Factor as completely as possible. If unfactorable, indicate that the polynomial is prime.
78) $7x + 78x^{rac{1}{2}} + 11$

Factor completely.
79) $4x^2 - 14x - 8$

Solve.
80) The length and area of the rectangle are given. Express the width as a binomial.

\[
\begin{array}{c}
\text{Area of rectangle} = 6x^2 - 22x + 12 \\
\text{width?} \\
\end{array}
\]

Factor as completely as possible. If unfactorable, indicate that the polynomial is prime.
81) $121 - w^2$

Factor as completely as possible.
82) $8a^4b - 98b^3$

Factor as completely as possible. If unfactorable, indicate that the polynomial is prime.
83) $25k^3m - 90k^2m^2 + 81km^3$

Factor the binomial completely.
84) $1000x^3y^6 - 128x^5y^3$

Factor the polynomial completely.
85) $x^{2n} - 36y^{2n}$

Factor as completely as possible. If unfactorable, indicate that the polynomial is prime.
86) $6x^2 + 18x - 6x - 18$

87) $x^4 - 8x^2 - 9$

Factor the polynomial completely.
88) $x^2(x - 2) - 7x(x - 2) + 6(x - 2)$

Solve the equation.
89) $b(b + 17) = 0$

90) $3x^2 - 27x + 60 = 0$
91) 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?

92) Find all values that make the expression undefined.

$$\frac{x^2 - 36}{x^2 - 10x + 16}$$

93) Simplify the expression.

$$\frac{4 - m}{m - 4}$$

94) Multiply. Simplify if possible.

$$\frac{6y}{12y + 6} \cdot \frac{10y + 5}{6}$$

95) Divide. Simplify if possible.

$$\frac{a^2 - 19a + 90}{10 - a} \div (a + 9)$$

96) Find the missing rational expression in

$$\frac{1}{4x + 5} \div \frac{?}{3} = \frac{1}{3}$$

97) Perform the indicated operation and simplify.

$$\frac{4y^2}{y - 1} + \frac{-4y}{y - 1}$$

98) Add or subtract as indicated. Simplify the result, if possible.

$$\frac{4y}{x^2 - y^2} + \frac{4x}{y^2 - x^2}$$

99) Express the perimeter of the rectangle as a fully simplified rational expression.

$$\frac{10}{x + 2}$$

100) Find the missing expression.

$$\frac{13x - 5}{x - 4} - \frac{?}{4 - x} = \frac{26x + 1}{x - 4}$$
1) Answer: 1.6 meters  
Objective: (1.8) Solve Apps: Exponents and Order of Operations

2) Answer: $69  
Objective: (2.1) Solve Apps: Equation (Addition Property)

3) Answer: 4  
Objective: (2.2) Solve Equation (Combine Properties)

4) Answer: 18,000 joules  
Objective: (2.2) Solve Apps: Equation (Multiplication)

5) Answer: 5/2  
Objective: (2.3) Solve Linear Equation

6) Answer: 30  
Objective: (2.3) Solve Linear Equation Having Fractions

7) Answer: 225.89 cm  
Objective: (2.3) Solve Apps: Solve Linear Equation

8) Answer: L = P - 2W/2  
Objective: (2.4) Solve for Variable in Formula

9) Answer: 0.00026  
Objective: (2.4) Write Percent As a Decimal

10) Answer: 3.2  
Objective: (2.4) Use Percent Formula

11) Answer: 780 students  
Objective: (2.4) Solve Apps: Formulas and Percents

12) Answer: 147.6°  
Objective: (2.4) Solve Apps: Use Pie Chart

13) Answer: -9(x + 12)  
Objective: (2.5) Write Phrase as Algebraic Expression

14) Answer: 3/4x = 1/2; {2/3}  
Objective: (2.5) Write Equation and Solve

15) Answer: president's salary = $187,500; department head's salary = $62,500  
Objective: (2.5) Solve Apps: Write Equation and Solve

16) Answer: 49 m to power of (2)  
Objective: (2.6) Use Perimeter/Area Formula to Solve Problem

17) Answer: 28π yd  
Objective: (2.6) Use Circumference/Area Formula for Circle to Solve

18) Answer: 26°, 128°  
Objective: (2.6) Solve Problem About Angles of Triangle

19) Answer: 133°  
Objective: (2.6) Find Angle's Complement or Supplement

20) Answer: 395.6 yd³  
Objective: (2.6) Solve Apps: Geometry Problems
21) Answer: [Image]
Objective: (2.7) Graph Inequality on Number Line

22) Answer: \[ x \geq 2 \]
Objective: (2.7) Write Inequality in Set-Builder Notation

23) Answer: \[ x < 4 \]
Objective: (2.7) Solve/Graph Inequality (Addition Property)

24) Answer: \[ x \leq -28 \]
Objective: (2.7) Solve/Graph Inequality (Multiplication)

25) Answer: \[ x \geq -2 \]
Objective: (2.7) Solve/Graph Inequality (Combine Properties)

26) Answer: at most 421 pounds
Objective: (2.7) Solve Apps: Solve Inequality

27) Answer: [Image]
Objective: (3.1) Use Point-Plotting to Graph Other Equation

28) Answer: (3, 103)
Objective: (3.1) Solve Apps: Graphing Linear Equations

29) Answer: no x-intercept; y-intercept = -8
Objective: (3.2) Identify Intercepts on Graph

30) Answer: (0, -5/4), (5, 0)
Objective: (3.2) Find Intercepts, Then Graph Equation

31) Answer: \[ x = -5 \]
Objective: (3.2) Write Equation for Horizontal or Vertical Line

32) Answer: 0
Objective: (3.3) Find Slope of Line Given Two Points

33) Answer: Undefined
Objective: (3.3) Find Slope from Graph

34) Answer: parallel
Objective: (3.3) Determine if Lines Through Points Are Parallel

35) Answer: -1/2
Objective: (3.4) Find y-Intercept Given Equation

36) Answer:

![Graph of a horizontal line](image)

Objective: (3.4) Graph Equation Not in Slope-Intercept Form

37) Answer: parallel

![Graph of two parallel lines](image)

Objective: (3.4) Graph Lines and Determine if Parallel

38) Answer: m = 2; The cost of the service increases $2 every mile the car is towed. b = 85; The cost of the service is $85 if the car is not towed.
Objective: (3.4) Solve Apps: Use Slope to Interpret Model

39) Answer: y = 5/2x + 3
Objective: (3.5) Write Equation Given Point and Slope

40) Answer: y = -3/2x - 4
Objective: (3.5) Write Equation Given Two Points

41) Answer: y = 178x + 3320
Objective: (3.5) Solve Apps: Point-slope Form of Equation

42) Answer: No
Objective: (4.1) Decide If Ordered Pair Is Solution
43) Answer: No solution
Objective: (4.1) Solve System of Equations by Graphing

44) Answer: (0, -7)
Objective: (4.2) Solve System by Substitution

45) Answer: $3.60 per slice of pizza
Objective: (4.2) Solve Apps: Solve System by Substitution

46) Answer: (3, 1)
Objective: (4.3) Solve System by Addition

47) Answer: No solution
Objective: (4.3) Solve System (No or Many Solutions)

48) Answer: (-6, 5)
Objective: (4.3) Use Best Method to Solve System

49) Answer: 9 and -3
Objective: (4.4) Solve Apps: Number Problems

50) Answer: 1 mph
Objective: (4.4) Solve Apps: Systems of Equations

51) Answer: Trinomial, degree 9
Objective: (5.1) Determine Degree of Polynomial

52) Answer: $4800
Objective: (5.1) Solve Apps: Use Model Containing Polynomial

53) Answer: $x^2 - 10x - 24$
Objective: (5.2) Multiply Polynomials

54) Answer: (6$x^2 + 3x$) sq. in.
Objective: (5.2) Solve Apps: Multiply Polynomials

55) Answer: 16$x^2 - 24x + 8$
Objective: (5.3) Multiply Binomials Using Foil Method

56) Answer: $x^4 - 121$
Objective: (5.3) Multiply Sum and Difference of Two Terms

57) Answer: 64$a^2 - 80a + 25$
Objective: (5.3) Square Binomials

58) Answer: 97$x^2 - 25$
Objective: (5.3) Express an Area as a Polynomial

59) Answer: 9$x^3 - 48x^2 + 60x$
Objective: (5.3) Solve Apps: Multiplying Polynomials

60) Answer: 125
Objective: (5.4) Evaluate Polynomials in Two Variables

61) Answer: 14$x^4 + 24x^2y^2$
Objective: (5.4) Add or Subtract Polynomials in Two Variables

62) Answer: 100$a^3b^8 - 90ab^7$
Objective: (5.4) Multiply Polynomials in Two Variables
63) Answer: $x^9 y^9$
Objective: (5.5) Use the Quotient Rule for Exponents

64) Answer: 17
Objective: (5.5) Use the Zero Exponent Rule

65) Answer: $\frac{64x^9}{y^6}$
Objective: (5.5) Use the Quotients to Powers Rule

66) Answer: $9x^6 + 9x^4 + 4$
Objective: (5.5) Divide a Polynomial by a Monomial

67) Answer: $x + 9$
Objective: (5.6) Divide a Polynomial by a Binomial

68) Answer: $2x + 7$
Objective: (5.6) Divide Using Synthetic Division

69) Answer: $-\frac{1}{25}$
Objective: (5.7) Use the Negative Exponent Rule

70) Answer: $\frac{x^3}{y^4}$
Objective: (5.7) Simplify Exponential Expression

71) Answer: 0.00000020319
Objective: (5.7) Write Number in Decimal Notation

72) Answer: $3.3203 \times 10^{-7}$
Objective: (5.7) Write Number in Scientific Notation

73) Answer: $2.5 \times 10^{-5}$
Objective: (5.7) Perform Computations in Scientific Notation

74) Answer: $4m^2(5m^7 - 2m^2 + 3)$
Objective: (6.1) Factor Out the Monomial GCF of a Polynomial II

75) Answer: $(x^2 + 5)(x - 1)$
Objective: (6.1) Factor by Grouping

76) Answer: $(x + 10)(x - 7)$
Objective: (6.2) Factor Trinomial $(x^2 + bx + c)$

77) Answer: $x(x + 5)(x - 6)$
Objective: (6.2) Factor GCF from Trinomial, then Factor

78) Answer: $(7x + 1)(x + 11)$
Objective: (6.3) Factor Trinomial $(x^2 + bx + c)$

79) Answer: $2(2x + 1)(x - 4)$
Objective: (6.3) Factor GCF from Trinomial, then Factor

80) Answer: $3x - 2$
Objective: (6.3) Solve Apps: Concept of Area in Factoring

81) Answer: $(11 - w)(11 + w)$
Objective: (6.4) Factor Difference of Two Squares
82) Answer: \(2b(2a^2 + 7b)(2a^2 - 7b)\)
Objective: (6.4) Factor Out GCF, Then Factor Difference of Two Squares

83) Answer: \(km(5k - 9m)^2\)
Objective: (6.4) Factor Perfect Square Trinomial

84) Answer: \(8x^3y^9(125y^3 - 16x^3)\)
Objective: (6.4) Factor Sum or Difference of Two Cubes

85) Answer: \((x^n + 6y^n)(x^n - 6y^n)\)
Objective: (6.4) Factor Special Forms

86) Answer: \(6(x + 3)(x - 1)\)
Objective: (6.5) Factor Completely Using Multiple Methods I

87) Answer: \((x + 3)(x - 3)(x^2 + 1)\)
Objective: (6.5) Factor Completely Using Multiple Methods II

88) Answer: \((x - 6)(x - 1)(x - 2)\)
Objective: (6.5) Factor Polynomials

89) Answer: \(b = -17, b = 0\)
Objective: (6.6) Solve Factored Quadratic Equation

90) Answer: \(x = 4, x = 5\)
Objective: (6.6) Solve Unfactored Quadratic Equation

91) Answer: 5 sec
Objective: (6.6) Solve Apps: Quadratic Equations

92) Answer: \(x = 8, x = 2\)
Objective: (7.1) Find Undefined Value

93) Answer: -1
Objective: (7.1) Simplify a Rational Expression

94) Answer: \(\frac{5y}{6}\)
Objective: (7.2) Multiply Rational Expressions, Simplify

95) Answer: \(-\frac{a - 9}{a + 9}\)
Objective: (7.2) Divide Rational Expressions, Simplify

96) Answer: \(\frac{3}{4x + 5}\)
Objective: (7.2) Analyze and Interpret Mult/Div of Rational Expr

97) Answer: \(\frac{4y}{x + y}\)
Objective: (7.3) Add/Subtract Rational Expr w/ Same Denominators

98) Answer: \(-\frac{4}{x + y}\)
Objective: (7.3) Add/Subtract Rational Expr w/ Opposite Denominators

99) Answer: 20 inches
Objective: (7.3) Solve Apps: Perimeter

100) Answer: \(13x + 6\)
Objective: (7.3) Analyze and Interpret Add/Subtr of Rational Expr