1. Identify the coefficients, variable terms (with exponents), and constants in the following expression.

            2x3+5y2-3z+1

2. Identify the coefficients, variable terms (with exponents), and constants in the following expression.

            4z5-8x2-6

3. Combine like terms in the following expression. (Hint: You can color code the like terms.)

            8x2+3x+9-x2+7x-2+y

4. Distribute and combine like terms in the following expression.

            3(6y2-9+7x-2x2-3x-6)

5. Write and simplify an expression that applies the distributive property. Include **at least 3** different terms.

6. Simplify the expression using the order of operations. (Note: \* stands for multiplication.)

            (6\*2-4) – 3(8-5) \* 7

                2

7. Simplify the expression using the order of operations.

            (3-5) \* -| -22 - 52 \* 4|

8. Translate the following statement.

       *The product of 3 more than a number and 3 less than the same number.*

9**. Translate** and **solve** the following statement.

           *The quotient of 2x and 4 is the same as the product of 6 and 3.*

10. Write and translate your own statement using at least **two** different operations (i.e., add, subtract, multiply, divide).

11. Simplify the expression. (Hint: Careful with the signs)

            -6(-42-7)

12.  Simplify the expression.

            (-10)2 \* -|23-7+12|

For problems 13 and 14, evaluate the expressions using the following values.

            x = -3               y = 8                 z = -12

13.     2y+3z

 4x

14.    4x2-2z2

For problems 15 and 16, evaluate the expressions using the following values.

            a = -1               b = 11              c = -7

15.  14a + (7- 6b)

         c

16.  (a2+b2)(b2-c2)

For problems 17–20, solve the equation. Check your answer by plugging it back into the equation.

17.  10x = 9x-15

18.  4x-9 = 7x+3

19.  -3(8x-2x) = 72

20.  9(4y-3)-12y = 4(27+5y)

21. Companies often sell products at or below cost in order to draw in and retain customers. Redman Manufacturers is tracking 5 items from last month’s sales. On item #1 they make $15; item #2 loses $4; item #3 makes $9; item #4 loses $6; and item #5 makes $12. Last month’s sales are as follows:

Item #1: 90 units sold

Item #2: 103 units sold

Item #3: 78 units sold

Item #4: 45 units sold

Item #5: 164 units sold

Write, simplify, and, calculate the **profit or loss** for the month.

22. When principal (P) is invested at a rate of (R) over a period of time (T) in years, simple interest (I) is earned.  The simple interest is calculated by multiplying the principal, rate, and time.  Write an equation to represent this scenario.

23. Using the formula above, calculate the interest earned for an investment of $15,000 at a rate of 5% over 10 years.

24. The perimeter of a rectangle is P=2L+2W where L is the length and W is the width.  Find the perimeter when L=15 and W=25.  Show your work.

25. The formula for a triangle is A= 1/2bh. If the area of a triangle is 36 and the height is 9, what is the base?

26. The formula F= 9/5C+32 relates Celsius and Fahrenheit temperature. If the current temperature is -20°C, what is the temperature in Fahrenheit?

27. A triangle has sides measuring x+7, 2x+3, and 5x-6. Write and simplify an expression that represents the perimeter of the triangle.

28. Floral Solutions is calculating their profits for the previous month. Profit is determined by revenue minus the cost. The cost of producing floral arrangements is represented by the equation C= 18+35x and the revenue is represented by the equation R=80x+12.

* 1. Find the simplified expression that represents the profit.
	2. Find the profit made when 110 arrangements are sold.

29. Jamie sold her house for *x* dollars. The real estate agent received a 5% commission and Jamie received $197,125. **Write** and **solve** an equation to determine the selling price of the house.

30. Dan works on commission and earns 4% on all of his sales. In month 1, he sold $25,000; month 2 was $17,000; and month 3 was $34,000. 18% of his total earnings are taken out for taxes. Calculate the total net (after taxes) pay Dan earned over the 3 months. **Write** and **simplify** an expression that represents this scenario.

31. A = 1/2*bh*; solve for *h*

32. F = 9/5*C* + 32; solve for *C*

33. *P* = 2L + 2*W*; solve for *W*

34. 2(*z* – 6) + 10*z* = 8(*z* – 2)

35. 7 – 6(5 – *y*) = 10(*y* – 4)

36. 1/4*x* – 18 = 1/2*x* – 6

37. 5/6 = -2/5*b* + 1/3*b*

38. -0.08(*x* – 100) + 0.07*x* = 90

39. 0.75(*a* – 35.8) = *a* – 22.4

Solve the following absolute value equations. ***Hint:***There may be two answers.

40. |14 – *y*| = 12

41. 3|6 – *d*| = 18

42. |2(*p* – 4) – 5| = 23

43. 2 + 4|5*x* – 7| = 46

44. 1/4|6*x* – 3| = 18.75

**Solve** and **graph** the following inequalities on a number line.

Example graph:



Note: When completing this assignment in the Case 2 Answer Template, go to "insert" then "shapes" to select the circles and line(s). Use "shape fill" to make the circle either open or solid.

45. *x* + 7 > 11

46. 1/8 ≤ 1 – 1/4*x*

47. -1 ≤ 2 – 3*x* < 8

48. 2 > 4*y –* 4 ≥ – 4

      3       3

49. -8x > 16 *or* 5/6*x* > 5

50. -7 + *z* ≤ 3z + 7 *and* 2(z – 3) < -4z + 2

51. A firm pays $1.75 for each copy of a magazine and sells each one for $2.50. There is a fixed monthly cost of $40 for printing the publication. If the firm wants to make $550 next month, how many magazines do they have to sell? **Write** and **solve** an equation that represents this scenario.

52. Martin sold his computer and software for $900, receiving three times as much for the computer than the software. What was the selling price of the computer and the software? **Write** and **solve** an equation.

53. The perimeter of a pool is 64 feet and has a width of x and a length of x – 4. **Write** an equation and **find** both the width and length of the pool.

54. The tax on a purchase was $9.33.  If the sales tax rate is 6%, how much was the purchase? **Write** and **solve** an equation.

55. Mike needs at least a 75% average to pass his math course. The class contains 5 exams that are equally weighted. If he scored a 64%, 86%, 71%, and 90% on the first 4 tests, what score does he need on the final test to earn at least a 75% in the class. **Write** and **solve** an inequality.

56. The Parkers are installing a wooden fence in their backyard. They have 330 feet of wood. The length can be no more than 90 feet. **Write** and **solve** an inequality to find the maximum width of the fence.

57. Paula is an office manager for ABC Advertising. She has been tasked with finding a copy machine that falls within a budget of $750 per month. She finds a company that will lease the machine for $275 a month. Each copy costs 4¢ and a ream of 500 sheets of paper costs $5.00. If she estimates that they will make 10,500 copies per month, is leasing this machine a good choice? **Write** and **solve** an inequality and explain your reasoning.

58. Peter is throwing a surprise party for his friend Tammy. He has a budget of $350. If the restaurant charges $20 per person for drinks and food and a cleanup fee of $35, what is the maximum number of people that he can invite to stay within budget? **Write** and **solve** an inequality. (***Hint***: Don’t forget to include both Peter and Tammy as guests.)

59. Sally calculated that she will lose 4.6 calories per minute walking at a rate of 3 miles per hour. How many minutes does she need to walk to burn at least 250 calories? **Write** and **solve** an inequality, rounding to the nearest tenth. (***Hint***: Check your final answer.)

60. When solving an inequality, when is the sign reversed?

61. **Slope:**  m = change in y = y2-y1

change in x    x2–x1

62. **Slope-intercept form:**  y = mx + b

63. **Point-slope form:**  y-y1= m(x-x1)

64. **Standard form:**  Ax + By = C; where A is a positive value

65. Find the slope of the points. Reduce to lowest terms.

1.  (0, -2) (4, 6)

2.  (7, 3) (9, 3)

3.  (5, 2) (1, 5)

4.  (12, 4) (12, 6)

66. Identify the slope and y-intercept in the following equations.

5. 2x+3y=8

6. 6x=y+1

67. Write an equation of a vertical line passing through the point (6, 3).

68. Write an equation of a horizontal line passing through the point (2, 8).

69. Write an equation of a line in slope-intercept form with a slope of -4 and passing through the point (0, -3).

70. Write an equation of a line in slope-intercept form with a slope of 1/2 and passing through the point (0, 6).

71. Write an equation of a line in point-slope form with a slope of -3/4 and passing through the point (1, -5).

72. Write an equation of a line in standard form with a slope of -8 and passing through the point (-10, 2).

73. Write an equation of a line passing through the points (-2, -1) and (0, 4). Write the final answer in slope-intercept form.

74. Write an equation of a line passing through the points (-3, 6) and (-5, 3). Write the final answer in slope-intercept form.

Graph the following equations and inequalities on a coordinate plane, shading the solution set where necessary.

Note: When completing this assignment in the Case 3 Answer Template, go to "insert" and "shapes." Choose the circles for the points and the lines to connect the dots. Use the arrows to represent the shading.

For example:



75.  y= 4x-2

76.  2x+5y=10

77.  x=3 and y=6

78.  3x+5y ≤ 15

79.  y < -2x-3

80.  x > 4 and y ≤ -1

*Write the final answer in the terms being asked such as dollars/cents, degrees, tickets, etc.*

**Slope:**  m= change in y = y2-y1

 change in x     x2-x1

**Slope-intercept form:**  y=mx+b

81. Your monthly commission as an appliance sales person is represented by the equation, S = 50x+450, where 50 is the rate paid for each appliance sold, *x* is the number of appliances sold, 450 is the base pay per month, and S is the salary. Complete the following table to represent your total salary for *x* appliances sold. Show your work for each one.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *x* | 14 | 22 | 25 | 40 | 51 |
| S |   |   |   |   |   |

82. You are offered the option of choosing a yearly salary of $45,000 or continue working on commission.

* 1. A. Using the equation from problem #1, how many appliances do you have to sell per year in order to match this salary? (Hint: $450 is the base pay per month, not year. Multiply the base pay by 12 to represent a full year.)
	2. B. If you currently average 74 appliance sales per month, which option should you choose?

83. Best Car rental agency charges a flat rate of $40 and 10¢ per mile to rent a standard car. A+ Rentals charges a flat rate of $35 and 20¢ per mile for the same car.

* 1. A. Write an equation to represent the total cost (y) and number of miles (x) of renting from each company.
	2. B. If you plan to rent a car and travel 500 miles, which plan would you choose and why? Show your work.
	3. C. How many miles do you need to drive for both plans to cost the same?

84. The cost of producing cell phones is represented as C=mx+b, where *m* is the marginal cost, *x* is the number of phones produced, *b* is the fixed cost, and C is the final cost.

* 1. A. If the fixed cost is $75 and the marginal cost is $8, write the cost equation.
	2. B. In March, the total cost was $18,955. Calculate the number of phones produced using the equation.
	3. C. If the goal for March was to produce at least 2,000 phones, did the company meet this goal? Show mathematically the number of phones by which the company exceeded or missed the goal.

85. Tim works part-time at a retail store. His salary varies directly by the number of hours worked. Last week he earned $99.45 for 13 hours of work. This week he earned $160.65.

* 1. A. **Write** and **solve** an equation that represents this scenario.
	2. B. How many hours did he work?

86. Three years after purchase, a car is estimated to be worth $24,000. At five years, its value is $19,000. If the car is depreciating in a linear manner, write an equation that represents the depreciation of the car. Answer the following questions:

* 1. A. How much is the car depreciating each year?
	2. B. What was the purchase price of the car?
	3. C. If the car continues this rate of depreciation, what will its value be at year 10?

87. On a particular April day, the temperature at 8 a.m. was 40°F. By 4 p.m. the temperature was 64°F. What was the hourly rate of temperature change?

88. The cost for an electrician is $135 for 3 hours. A 7-hour repair costs $315. Showing your calculations, determine the price of a 12-hour repair.

89. Sarah has two part-time jobs and needs to earn at least $300 total per week. Job A pays her $10 an hour and job B pays $7.50 an hour. Write an inequality that represents this scenario. Name and label your variables, such as Job A= x.

90. A manufacturer produces a 4-cup and 8-cup coffee maker. The 4-cup maker takes 6 hours to produce and the 8-cup takes 9 hours. The manufacturer has at most 500 hours of labor per week.

* 1. A. Write an inequality to represent the number of each type of coffee makers they can produce in a week.

B. Is it possible to produce 20 4-cup and 30 8-cup coffee makers in a given week? Explain why or why not showing all of your calculations.

91. What are the 3 methods for solving systems of equations? Which one do you prefer and why?

92. Describe a consistent system.

93. Describe an inconsistent system.

94. Describe a dependent system.

Solve the following systems of equations using the graphing method.

 **What type of system is it? Name the solution if there is one.**

95. x + y = 5

 -x + y = 3

96. 2x – 2y = 8

 x – y = 4

97. 3x – y = -2

 3x – y = 4

98. y = 6

 x = -3

Solve the following systems of equations using the substitution method.

**What type of system is it? Name the solution if there is one.**

99. x = 6y + 2

 3x – 18y = 4

100. x – y = 3

 x + 3y = 6

101. y = -2x

 4x – 3y = 12

102. 2x – 5y = 15

 x – 7y = 3

Solve the following systems of equations using the addition (elimination) method.

**What type of system is it? Name the solution if there is one.**

103. x + y = 6

 x – y = 4

104. -2x + 3y = 5

 2x – y = 1

105. 5x + y = 2

 3x + y = 1

106. 5x = 20 + y

 16 = 3y + 4x

Solve the following systems of inequalities using the graphing method.

**Shade the solution set.**

107. x + y > 4

 y + 3x < 6

108. x ≥ 5

 y < 3

109. 3x – 2y > 8

 -2y + 3x < 12

110. 2x + y < 8

x ≥ 4

111. Describe the three types of solutions systems of equations have when graphed.

112. The sum of two numbers is 30 and their difference is 2. Find the two numbers by writing and solving a system of equations.

113. Two apples and three pears cost $3.45. Three apples and five pears cost $5.55. Find the cost of each type of fruit.

114. Mary has a total of $5,000 invested in two accounts. One account pays 5% and the other 8%. Her interest in the first year was $331. Write and solve a system of equations to find out how much she has invested in both accounts.

115. Terry is mailing two boxes. Together they weigh 21 lbs. If the smaller box is 5 lbs. less than the larger one, how much does each box weigh? Write and solve an equation that models this scenario.

116. The length of a pool is 3 feet more than twice its width. If the perimeter of the pool is 72 feet, find the dimensions of the pool by writing and solving a system of equations.

117. A desk and a chair cost $200 as a set. If the desk costs four times more than the chair, how much does each one cost? Write and solve using a system of equations.

118. Rachel has 15 coins with a value of $2.85. If the coins are either dimes or quarters, how many of each coin does she have? Write and solve using a system of equations.

119. A music concert was attended by 450 people. Adult tickets sold for $70 and children’s tickets for $40. If total sales were $27,750, how many of each ticket was sold?

120. A party planner can spend a maximum of $5,000 on food. If the chicken dinner (x) costs $20 and the steak dinner (y) costs $25, make a graph of the region that shows the possibilities for the number of chicken and steak dinners that can be purchased while still staying within budget. Shade the solution set.

Simplify.

121. (42)3

122. 

123. 

124. (a4b6)0

125. (-2x)-6

Evaluate each polynomial for the given value of the variable.

126. -x2-5x+6;   x = -3

127. 2x2-4x-1;    x = 5

Add the polynomials.

128. (4y+5y2) + (2y3-8y2)

129. (3x2-2x-3) + (-7x2+5-8x)

Subtract the polynomials.

130. (4a2+9b5) – (-2a2-6b5)

131. (-7-2z3+4y) – (3z3+12-6y)

Use the FOIL method to simplify the binomials.

132. (x-10) (x-9)

133. (2x-2) (x+5)

134. (3y-4)2

135. 3x(x-1) (5x+9)

136. (y-3)(2y3-4y+5)

Compute and write your answer in scientific notation.

137. (5.2 x 1013) (7.1 x 10-22)

138. (4.3 x 10-8) (1.5 x 109)

139. 8.2 x 105

 2.75 x 10-3

140. 6.3 x 10-7

3.25 x 10-12

141. Your friend Mary computes (x5)(x7) and gets and answer of x35. Explain why her answer is incorrect and include the correct answer.

142. Is (x+y)2 equal to (x2+y2)? Explain why or why not using an example to support your answer.

143. When multiplying two terms with the same base, \_\_\_\_\_\_\_\_\_\_\_\_\_ the exponents. When dividing two terms with the same base, \_\_\_\_\_\_\_\_\_\_\_\_\_ the exponents.

144. John wants to hire an editor to check his thesis paper. The editor charges a flat rate of $50 and $2 per page. Write a polynomial to describe the cost. Find the cost of editing 75 pages.

145. The distance from the Earth to the sun is 93,000,000 miles. Write this number in scientific notation.

146. A scientist measures a speck of sand as having a diameter of 0.00000034. Write this number in scientific notation.

147. Stacy wants to build a triangular sand box for her son. Using the figure below, calculate the area of the triangular box, writing the answer as a polynomial.

(Hint: A=1/2bh)



148. Victoria wants to plant a vegetable garden in the shape of a square. She has a space allocated in her backyard that will accommodate 175 square feet. Using the drawing below, use the FOIL method to find the polynomial that represents the area of the square. If x=6, will she have enough room to plant the garden?



149. Sam needs to fill up a box with packaging material. Use the picture below to calculate the volume of the box.



150. Jen and Jacob want to put a concrete deck around their pool. Use the figure below to calculate the area of the deck. Second, simplify the area if x=4.75. Round to the nearest hundredth.

