1. Plot the following points and tell in which axis or quadrant they are located.
    A $(3,0)$, B $(-2,1)$, C $(3,-4)$, D $(-3,-1)$, E $(2,4)$, F $(0,-3)$

2. Doug has scores of 71, 63, 72, and 71 on his first four exams. What score does Doug need on his fifth exam to raise his overall average to a 70 (Each exam is worth 100 points)?

3. Manuel is 5'5" tall. Ben is 1.5 meters tall. Who is taller and by how much? (Hint: Convert both heights to inches to compare… 2.54 cm = 1 inch)

4. A football team gained 9 yards on the first down, lost 15 yards on the second down, and gained 12 yards on the third down. How many yards does it need to gain on the fourth down to have a 10 yard gain (aka first down) from its starting position?

5. Three brands of cornflakes are available to buy. You have a coupon for $0.50 off Brand P and a coupon for $0.60 off Brand G. Which cereal is the best buy?

Type	Price	Package size
Brand G	$2.39	10 ounces
Brand K	$4.19	17.7 ounces
Brand P	$2.89	14.9 ounces

Perform each of the fraction operations and write answer in simplest form.

6. $\dfrac{8}{5}+\dfrac{1}{3}$

7. $\dfrac{7}{8}-\dfrac{3}{7}$

8. $3\dfrac{1}{6}-\dfrac{3}{4}$

9. $\dfrac{11}{4}\cdot\dfrac{6}{7}$

10. $\dfrac{7}{8}\div\dfrac{3}{7}$

11. $3\div\dfrac{6}{11}$

12. A rectangular garden has dimensions of 16 ft by 15 ft. The homeowner wants to increase each dimension by 20%.
    a. What is the original perimeter?
    b. What is the original area?
    c. What is the new increased perimeter?
    d. What is the new increased area?
    e. By what percent does the perimeter increase?
    f. By what percent does the area increase?

13. A local high school has 1128 students with 371 freshman, 319 sophomores, 225 juniors and 213 seniors. What is the empirical probability a chosen student is an upperclassman (junior or senior) at this school?

14. Write an expression with at least 4 terms, of which one has 3 factors.

15. Write an equation with at least 2 constants and at least two variables.

16. Write a polynomial with 4 terms.

17. Write a trinomial of degree 4.

18. Write a monomial of degree 2.

19. True or False. In the expression $3x^2-7x+4$, x is a term.

20. Are the following proportional? 232 miles in 4 hours and 509 miles in 7 hours. Explain.

21. Consider the following data

Height (in.)	65	69	72	71	75	62	64	68	74	70
Armspan (in.)	63	70	71	66	77	64	67	68	71	68

a. Create a scatterplot for the data.

b. Explain the trend shown in the scatterplot

22. A drink recipe calls for 2 parts soda to five parts OJ. Below are several statements, circle all that are correct.

   a.   For every cup of soda you need $2\frac{1}{2}$ cups of OJ.

   b.   The ratio of OJ to soda is 2:5.

   c.   If you drink 21oz of this drink, you will consume 8oz of soda.

   d.   If you want to use 20 gallons of OJ in this drink, you will need 8 gallons of soda.

23. If the ratio of girls to boys in a classroom is 1:3 and there are 8 girls in the class, how many boys are there?

24. If you make $76 in an 8 hour day, how much do you make per hour? Per minute? Round answers to the nearest cent.

25. For each problem, state positive, negative, or it depends. If you state it depends, give two examples to support your answer.

a. Negative − Negative

b. (negative) · (negative) · (negative)

c. positive − negative

Perform the following operations.

26. $12 + (-5) =$ _____

27. $-16 + (-30) =$ _____

28. $\dfrac{6}{0} =$ _____

29. $(6)(-1)(-2)$

30. $\dfrac{-14}{7} =$ ____

31. $2 - (-18) =$ ____

32. $\left| -2 \right| - \left| -7 \right|$

33. Find 4 distinct numbers that have a mean of 6.

34. A student has to take 5 tests in a history class. If her average on the first 4 test is a 66%, what grade does she need to make on her 5th test so that her test average is a 70%? Assume all 5 tests are worth the same amount.

35. True of False. Pie charts are most useful for part-to-whole comparisons.

36. If 1 mile is 5,280 feet, convert 260,000 inches to miles. Round to one decimal place.

37. If 1 mile ≈ 1.61km. Convert 20 miles to kilometers. Round to one decimal place.

38. If a store buys a coat for $20 and marks it up 25%, at what price is the store selling the coat?

39. January 1st Bob weighed 250 pounds and on February 1st Bob weighed 240 pounds. What is Bob's percent of weight loss?

40. A recipe for lemon bars calls for a $9" \times 13"$ pan. How many $1" \times 1"$ bars can be cut? How many $2" \times 2"$ bars can be cut? How much is wasted if you serve only the $2" \times 2"$ square bars?

41. Write a function to model the data given in the table.

42. If a pasta sells for $3.55 for a 20-ounce box,
   a.   What is the price per ounce? Round to the nearest cent.
   b.   How many ounces do you get per dollar? Round to the nearest tenth of an ounce.

43. Gas prices have recently increased from a nationwide average of $3.33/gallon to $3.54/gallon nationally. By what <u>percent</u> have gas prices increased? Round answer to one decimal place (ex. 19.3%).

44. Is a 10% discount, followed by a 15% discount, the same as a 25% discount? Explain why it is the same or give a counterexample to prove that it is not.

45. After the announcement of the iPhone 8, Best Buy discounted the $799.99 iPhone 7 by 9%. If sales tax is 5.5%, what is the total price of an iPhone 7? Round to the nearest cent.

Number of minutes, M	Cost, C
0	$20.00
1	$40.00
2	$80.00
3	$160.00
4	$320.00

46. a.   Calculate the GPA for the following student. Round to two places. (Remember A=4, B=3, etc.)

47. Find the mean, median and mode for the following data set
$$-5 \quad -4 \quad -3 \quad 3 \quad 4 \quad 5 \quad 10$$

Class	Credit Hours	Letter Grade
Math	4	C
Speech	3	A
Biology	3	C
Comp and Lit	3	B
Music	2	B

48. Create a data set with seven values so that it has the same median as the data set above, but with a larger mean.

Simplify each of the following:

49. $\dfrac{36x^{26}}{6x^6}$

50. $\dfrac{-18x^{20}}{6x^5}$

51. $\left(\dfrac{4x^9}{2x^2}\right)^2$

52. $6x^6 + 6x^6$

53. $-2x^4 + 8x^4$

54. $-3x^5 \cdot 2x^3$

55. $(-3x^3yz^2)^4$

56. $\dfrac{10m^8n^3}{35m^6n}$

57. $\dfrac{\left(3xy^5\right)^2 (2x^2y)}{x^3y^6}$

58. $-(3x)^0 \cdot 2x^{-7}$

59. $8xy - 2x + 4y - 2xy + 8x$

60. $\left(2x^2\right)^4$

61. $\left(-5x^4\right)^2$

62. $\dfrac{-2+\sqrt{2^2-4(3)(-1)}}{6}$

63. $(-3)^2$

64. $2xy^0$

65. $\dfrac{(2x)^2}{-9x^7y}$

66. -6^2

67. $(2x+3)-(x-6)$

68. $-11-2(5-x)$

69. $2(x-8)-(4x+5)$

70. $5-20\div5\cdot4$

71. $\dfrac{2}{3}x-1+\dfrac{3}{4}x+\dfrac{5}{8}$

72. A sock drawer contains 2 black socks, 6 red socks, and 4 gray socks. The socks are not connected in pairs. What is the probability of pulling out a red sock?

73. Evaluate $\dfrac{xy+6z}{x-y}$ if $x=3,\ y=-6$ and $z=3$

74. Evaluate $\dfrac{-4xy}{x^2-y^2}$ if $x=-1$ and $y=-3$

75. A recipe includes the following ingredients and yields one dozen cookies. Rewrite the recipe but scale it to use 9 eggs. Now how many cookies does the recipe yield?

      3 eggs + 5 cups flour + 5 tablespoons butter + 2 cups sugar $\rightarrow$ 12 cookies

76. You participate in a raffle by purchasing 7 tickets. If 560 tickets were sold, compute the following probabilities:
   a.   You win
   b.   You lose

77. Use the formula $C=\dfrac{5}{9}(F-32)$ to change 100 degrees Fahrenheit to degrees Celsius. Clearly show every step. Round the final answer to the nearest tenth of a degree.

Solve each of the following equations, if possible.

78. $-\dfrac{2}{5}x=-4$

79. $-\dfrac{1}{4}(x-8)+\dfrac{1}{2}(x+2)=x+9$

80. $\dfrac{x+2}{3x+8}=\dfrac{2}{5}$

81. $5=y-7$

82. $3-x=-7$

83. $\dfrac{x}{5}=-25$

84. $3(2x-8)-6=-7-5x+11$

85. $\dfrac{-5}{2x+1}=\dfrac{9}{6x-2}$

86. $2x-1=4+2x-5$

87. Find the volume V and surface area SA of a right circular cylinder with radius 5 inches and a height of 6 inches. Use the formulas $V=\pi r^2 h$ and $SA=2\pi r^2+2\pi rh$.

88. Find the volume of the cone including units if the radius is 9 inches and the height is 1.5 feet. $\left(V=\dfrac{1}{3}\pi r^2 h\right)$. Round answer to one decimal place.

89. Suppose a particular city estimates that only $\dfrac{2}{5}$ of its eligible voters went to the polls. If 30,000 voters were at the polls, how many eligible voters does the city have?

90. If 2 dollars can be exchanged for 500 Russian rubles, how many Russian rubles can be obtained for 1300 dollars?

91. Determine the following:
  a. Is $x=9$ a solution of $x^2-13x+42=0$
  b. Is $x=7$ a solution of $x^2-13x+42=0$

92. For each equation, state if it is sometimes, never or always true
  a. $-3(x+4)=4x+12-7x$
  b. $2x+3+2x=4x+2+1$

93. True or False. Every data set has a mode.

94. True or False. If the result of a linear equation is $0=0$ the answer is no solution.
.

95. Rewrite $7(x+y)$ using the commutative property of addition.

96. Rewrite $7(x+y)$ using the commutative property of multiplication.

97. Rewrite $6+(x+2)$ using the associative property of addition.

98. Find the probability of rolling a **sum** of 10 if a **PAIR** of dice are rolled.

99. The stock market dropped 3% today and is now at 12,550 points. How many points was the stock market yesterday? Round your answer to the nearest point.

100. Your grade in a class is entirely based on exams and quizzes. Given the following scores, if each quiz represents 5% of your grade, each exam represents 15% of your grade, and the final exam represents 30% of your grade, what is your overall grade in the class?

Category	Grades (each out of 100%)
Quizzes	88, 76, 92, 95, 68, 81, 76, 74
Exams	71, 83
Final Exam	85

101. The formula $A=P\left(1+\dfrac{r}{n}\right)^{nt}$ calculates the future value of an investment if you invest P dollars at an interest rate of r (as a decimal). The variable n is the number of times per year the interest is compounded. The variable t is the number of years the money is invested. If you invest \$5,000 at an interest rate of 4% compounded monthly, how much will you have after 15 years?

102. How much packaging does a cereal box with height 10 inches, width 2 inches, and length 4 inches require?

103. For each pair of variables, determine if you expect a positive or a negative correlation. Explain!!
    a. Number of drivers and snowfall in inches
    b. Spending and income

104. Consider the points $(-3,6)$ and $(9,-10)$. Find the slope of the line passing through these points.

105. A line has slope $-\dfrac{1}{4}$ and passes through $(-4,3)$. Complete the chart so that each point on the table lies on the line.

x	y
-4	3
0	
4	
8	

106. Give the slope of a
    a. Horizontal line_____
    b. Vertical line _____

107. Jane's son had a growth spurt that started at age 12 and continued until age 15. He grew from 5'3'' to 6'2''. What was his average growth per year? (round to the nearest hundredth)

108. Complete the table by continuing the pattern. Then graph the resulting line.
109. A man has a starting weight of 207 pounds and is losing 13 pounds each month. Write a linear equation that models his weight with meaningful variables.
110. Identify the slope and the y-intercept and use it to graph.

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

x	y
0	10
1	8
2	6
3	
4	
5	

111. Write an equation of the line
    a. Passing through the points $(0,4)$ and $(1,7)$
    b. Vertical passing through $(2,-4)$
    c. Containing $(-4,0)$ with $m = 5$

112. A homeowner pays \$180.50 to have a plumber work for 3 hours. Another homeowner pays the same plumber \$281 for 6 hours worth of work. Write a linear equation for the cost of the plumber, y, based on the number of hours, x, the plumber works.

113. Complete the table for the given equation. Then graph the function.

$$y = 9 \cdot (1.6)^x$$

x	y
0	
1	
2	

114. Simplify: $\dfrac{1}{3^{-2}}$

115. Simplify: $\dfrac{\left(x^2 y^{-1}\right)^{-2}}{x^3}$

116. Solve $2x - 3y = 12$ for y.

117. Solve $A = \pi r^2$ for r.

118. If $f(x) = -3x - 8$ find $f(-1)$.

119. If $g(x) = \dfrac{2x+1}{x-4}$, what is the only value of x you can't substitute into g(x).

120. Determine whether the situation is best described by a linear model or an exponential model. Create a function for the situation.

The number of people who signed up for a social media platform is 100,000 and it doubles every year

121. Determine whether the situation is best described by a linear model or an exponential model. Create a function for the situation

The number of people who signed up for a club on campus is 47 and it decreases by 3 members per year

122. A car loses approximately 20% of its value every year after the initial purchase. The value of a $10,000 car t years after its initial purchase is then given by $V(t) = 10000(0.8)^t$. Determine the value of the car after 4 years.

123. A bakery sells all the fruitcakes they make on 16 days out of 30.
   a.   What is the empirical probability that the bakery will sell all the fruitcakes tomorrow?
   b.   What is the empirical probability that the bakery will not sell all the fruitcakes tomorrow?

   A: a. 0.533 b. 0.467

124. A new video watched by 1000 people got 190 likes and 70 dislikes. What is the empirical probability that the next viewer will neither like nor dislike the video?

125. Twelve students expressed the desire to take the position of class president. Let E be the event that the youngest student wins. What is P(E)?

126. Find the weighted mean: A teacher computes a student's average using a weighted mean where quizzes count 25%, homework 15% and exams 60%. If a student's quiz grade is 82%, homework 90% and exams 88%, what is the student's average?

127. Find the mode of the set. State if the data set it unimodal, bimodal, multimodal or has no mode
   6   4   5   6   5   8   7   10   6   5   9   10

128. What percent of 120 is 90?

129. 9.5 is 25% of _____?

130. _____% of 60 is 150

131. A real estate agent works on a 5% commission. How much would she need to sell a house for in order to earn a commission of $24,250?

132. A company manufactures and sells plastic boxes that cost $21 each to produce, and that sell for $28 each
   a.   How much profit does the company make on each box?
   b.   What is the percent of profit based on cost?
   c.   What is the percent of profit based on selling cost?

133. Determine whether a date set with the given correlation coefficient has a positive correlation, a negative correlation, or no correlation. If the data set has a positive or negative correlation, indicate whether it is strong or weak.
   a. $r = -0.15$
   b. $r = 0.9$
   c. $r = 0$

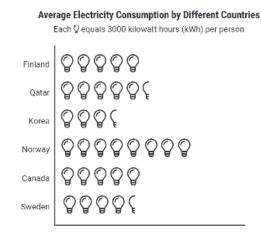**134.** State the domain and range and indicate if the relation is a function
$h = \{(-3,-3),(0,1),(-2,1),(3,1),(5,1)\}$

135. State the domain of $f(x) = \dfrac{35}{x-6}$

136. Find an equation for the line parallel to the y-axis and containing the point $(2,-4)$

137. If the sum of twice a number and 5 is divided by 11, he result is equal to the difference between 4 and the number. Find the number.

138. The total cost of a computer flash drive and an all-in-one printer was $96.94, including tax. If the cost of the flash drive was $58.96 less than the printer, what was the cost of each item?

139. Marcus drives from Chicago to Detroit in 6 hours. On the return trip, his speed is increased by 10 mph and the trip takes 5 hours. Find his rate on the return trip. Haw far apart are the towns?

140. Write the algebraic expression described by the English phrase
   a. Thirteen less than the product of four and the sum of a number and 1
   b. Fifteen decreased by twice a number
   c. Three times a number, less five times the same number
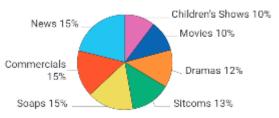
141.

Average Electricity Consumption by Different Countries
Each ♀ equals 3000 kilowatt hours (kWh) per person

a) What is the average consumption for Qatar?
b) Which of the three Nordic countries (Finland, Norway and Sweden) have the average electricity consumption of more than 14,000 kWh per person?
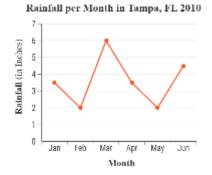
142.

20-Hour TV Programming at KCBA

a. In the 20 hour period shown, how much time (in minutes) is devoted daily to each category?
b. How much total time (in minutes) is devoted to drama, soaps and sitcoms?

143.

Rainfall per Month in Tampa, FL 2010

a. What was the most rainfall in a month?
b. What month had the most rainfall?
c. What was the mean rainfall over the six-month period (to the nearest hundredth)?

1. x-axis, Q II, Q IV, Q III, Q I, y-axis

2. 73
3. Manuel is about 6 inches taller.
4. 4 yards
5. Brand P is the best buy. (Brand G = $0.179 per oz., Brand K ≈ $0.237 per oz., Brand P ≈ $0.16 per oz.)

6. $\dfrac{29}{15}$

7. $\dfrac{25}{56}$

8. $\dfrac{29}{12}$

9. $\dfrac{33}{14}$

10. $\dfrac{49}{24}$

11. $\dfrac{11}{2}$

12. a) 62 ft b) 240 ft^2 c) 74.4 ft d) 345.6 ft^2 e) 20% f) 44%

13. $\dfrac{73}{188} \approx 0.388$

14. Answers will vary. Sample:
$10xyz + 3x - 2y + 4z$

15. Answers will vary. Sample: $5x - 3 = 2y + 1$

16. Answers will vary. Sample: $4x^3 - 2x^2 - 3x + 1$

17. Answers will vary. Sample: $5x^4 - 4x^3 + 2$

18. Answers will vary. Sample: $17x^2$

19. False. The terms are $3x^2$, $-7x$, and 4.

20. No. $\dfrac{232 \text{ miles}}{4 \text{ hours}} = \dfrac{58 \text{ miles}}{1 \text{ hour}}$ and

$\dfrac{509 \text{ miles}}{7 \text{ hours}} \approx \dfrac{72.7 \text{ miles}}{1 \text{ hour}}$

21. The data is roughly linear and positively correlated.

22. a and d
23. 24
24. $9.50 per hour, $0.16 per minute
25. a) It depends. $-2 - (-5) = 3$ while

$-5 - (-2) = -3$ b) negative c) positive

26. 7
27. −46
28. undefined
29. 12
30. −2

31. 20
32. −5
33. Answers will vary. Sample: 1, 3, 9, 11
34. 86%
35. True
36. 4.1 miles
37. 32.2 kilometers
38. $25.00
39. 4%
40. a) 117 b) 24 c) 21 square inch bars
41. $C = 20(2)^M$
42. a) $0.18 per ounce b) 5.6 ounces per dollar
43. 6.3%
44. No. $.85(.90(100)) \neq .75(100)$
45. 768.03
46. a) 2.73
47. a) 10/7 b) 3 c) no mode
48. -5, -4, -3, 3, 4, 5, 20

49. $6x^{20}$

50. $-3x^{15}$

51. $4x^{14}$

52. $12x^6$

53. $6x^4$

54. $-6x^8$

55. $81x^{12}y^4z^8$

56. $\dfrac{2}{7}m^2n^2$

57. $18xy^5$

58. $\dfrac{-2}{x^7}$

59. $6xy + 6x + 4y$

60. $16x^8$

61. $25x^8$

62. $\dfrac{1}{3}$

63. 9

64. 2x

65. $-\dfrac{4}{9x^5y}$

66. -36

67. $x + 9$

68. $2x - 21$

69. $-2x - 21$

70. -11

71. $\dfrac{17}{12}x - \dfrac{3}{8}$

72. $\dfrac{1}{2}$

73. 0

74. $\dfrac{3}{2}$

75. 9 eggs + 15 cups of flour + 15 tablespoons butter + 6 cups of sugar → 36 cookies

76. a) $\dfrac{1}{80}$ b) $\dfrac{79}{80}$

77.
$$C = \frac{5}{9}(100 - 32) \Rightarrow \quad C = \frac{5}{9}(68) \Rightarrow \quad C = \frac{340}{9} \approx 37.8^\circ C$$

78. x = 10

79. x = −8

80. x = −6

81. y = 12

82. x = 10

83. x = −125

84. $x = \dfrac{34}{11}$

85. $x = \dfrac{1}{48}$

86. All real numbers

87.
$$V = 150\pi \, \text{in}^3 \approx 471.2 \, \text{in}^3 \qquad SA = 10\pi \, \text{in}^2 \approx 345.6 \, \text{in}^2$$

88. $1526.8 \, \text{in}^3$

89. 75,000

90. 325,000 rubles

91. a) No b) Yes

92. a) Never true b) Always true

93. False

94. False

95. $7(y + x)$

96. $(x + y)7$

97. $(6 + x) + 2$

98. $\dfrac{1}{12}$

99. 12,938 points

100. 81.1%

101. $9101.51

102. SA = 136 in²

103. a) Negative. As the snowfall increases, the number of drivers decreases. b) Positive. As a person's income increases, their spending also increases.

104. $m = -\dfrac{4}{3}$

105. 2, 1, 0

106. a) 0 b) undefined

107. 3.67 inches per year

108. 4, 2, 0

109. $W = -13m + 207$

110. $m = -\dfrac{2}{3}$, y-intercept: $(0,1)$

111. a) $y = 3x + 4$ b) $x = 2$ c) $y = 5x + 20$

112. $y = 33.50x + 80.00$

113. 9, 14.4, 23.04

114. 9

115. $\dfrac{y^2}{x^7}$

116. $y = \dfrac{2}{3}x - 4$

117. $r = \sqrt{\dfrac{A}{\pi}}$

118. −5

119. 4

120. Exponential $f(x) = 100{,}000(2)^x$

121. Linear $f(x) = 47 - 3x$

122. $4096

123. a. 0.533 b. 0.467

124. $\dfrac{37}{50} = 0.74$

125. $\dfrac{1}{12} = 0.0833$

126. 86.8%

127. Mode: 5,6 ; bimodal

128. 75%

129. 38

130. 250

131. $485,000

132. a) $7 b) $33\dfrac{1}{3}\%$ c) 25%

133. a) weak negative b) strong positive c) no correlation

134.
$$D = \{-3, -2, 0, 3, 5\} \quad R = \{-3, 1\} \quad \text{Function}$$

135. $D = (-\infty, 6) \cup (6, \infty) \quad \text{or} \quad x \neq 6$

136. $x = 2$

137. 3

138. : flash drive $18.99   printer $77.95

139. : flash drive $18.99   printer $77.95

140. a) $4(x+1) - 13$ b) $15 - 2y$ c)
$$3x - 5x$$

141. 16,500 kWh; Finland and Norway

142. (a) News: 300 min ; Movies 120 min; Sitcoms 156 min; Soaps 180 min; Drama 144 min; Children's shows 120 min; Commercials 180 min.
(b) 480 minutes

143. (a) 6 inches   (b) March   (c) 3.58 inches