“A Problem a Day, While You’re Away”

For students who are

ENTERING 8th GRADE Math

Directions for Students

As you answer each problem, make sure you show your work. Students should be able to work each problem without a calculator. When you return to school, you will receive credit for completion, and some of the problems will be used on your first math test.

Students entering Algebra I are expected to:

- Understand percentages
- Write and recognize equivalent ratios
- Use proportions to solve problems

  - Write and solve proportions
- Simplify fractions
- Add, subtract, multiply and divide fractions
- Add, subtract, multiply and divide integers fluently
- Know the difference between a multiple and a factor
- Find the greatest common multiple
- Find the greatest common factor
- Use order of operations to simplify expressions
- Use the distributive property
- Identify and combine like terms
- Evaluate expressions

  - write variable expressions to represent real-world situations

  - simplify variable expressions

- Solve one-step and two-step equations
- Find basic square roots; know perfect squares
- Plot points in the coordinate plane
- Interpret information and quantities presented in a graph
- Find area and perimeter of squares, rectangles, triangles and circles (circumference rather than perimeter)
- Identify acute, right, and obtuse angles
- Find and interpret mean, median, mode and range.
- Predict basic probabilities.

Day 1 At the Northgate fabric store, there are 5 scrap pieces of cloth. Their lengths are $\frac{1}{2}$ yard, $\frac{3}{10}$ yard, $\frac{5}{6}$ yard, $\frac{1}{3}$ yard, and $\frac{2}{5}$ yard. How much total fabric does the owner have?

Day 2 Sergei is buying a shirt that is on sale for 14% off. Write an expression that could be used to find the sales price of the shirt.

Day 3 Use your expression from Day 2 to find the sales price of a shirt that originally cost $35. Round your answer to the nearest cent.

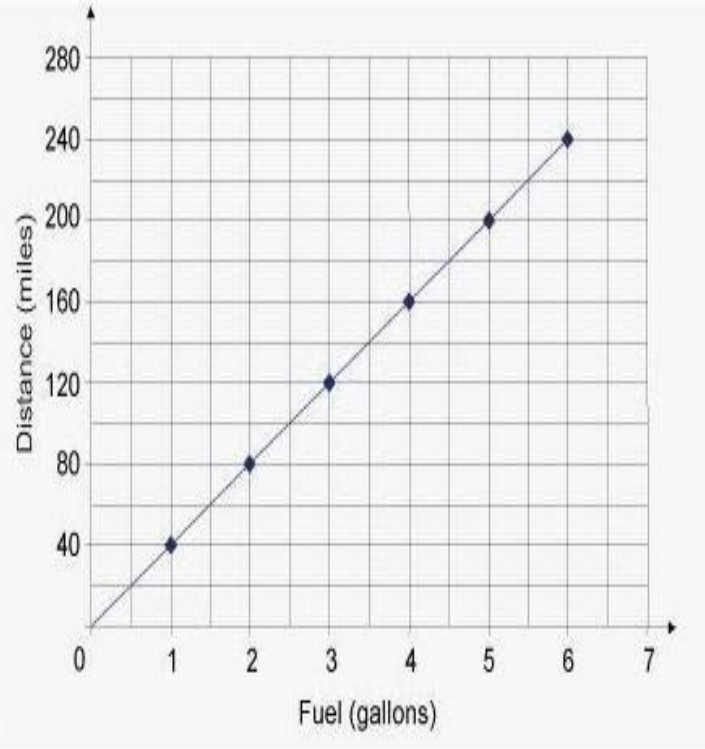
Day 4 A novelist can write $2\frac{1}{4}$ pages in $\frac{3}{4}$ hours. Express her writing speed as a unit rate in page per hour.

Day 5 A car can travel $\frac{2}{5}$ mile $\frac{1}{2}$ minute. What is the car's speed in miles per hour? Show or explain how you got your answer.

Day 6 Does the table show a proportional relationship? Explain why or why not.

x	**y**
1	9
2	18
3	27
4	36
5	45

Use the following graph for days 7-9



Day 7 What does the point (5,200) represent on the graph? Explain how you know you are correct.

Day 8 Which point shows the unit rate for this situation? What is the unit rate? Explain.

Day 9 Write an equation that could be used to find the distance (d) traveled for any amount of gasoline (g) used.

Day 10 Sam's bill at a restaurant is $12, and he leaves a 20% tip. What is the amount of the tip? Show your work.

Day 11 Steven and Will went to the Square One Mall to buy new jackets. They bought the same jacket but they bought them in different stores. Steven's jacket was 50% off the original price of $60.00. Will's was 30% off the original price of $60.00 but he had a coupon for 20% off the sale price. Explain why Steven got a better deal than Will.

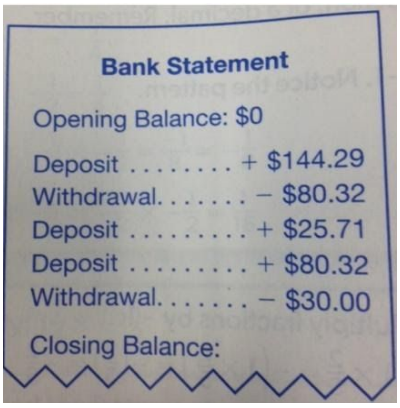
Day 12 A student at Garfield Middle School has three pairs of jeans – one black, one navy blue, and one stone washed. He also has three shirts – one white, one green, and one red. Make a tree diagram to show how many different outfits he can make.

Day 13 Alejandro walks along Revere Beach four nights in a row. His distance each night is given in the table. He walked a total of 12 ¼ miles on the four nights. Write an equation that represents Alejandro's total distance.

Day	Distance
Monday	3 ¼
Tuesday	2 ¾
Wednesday	3 ½
Thursday	x

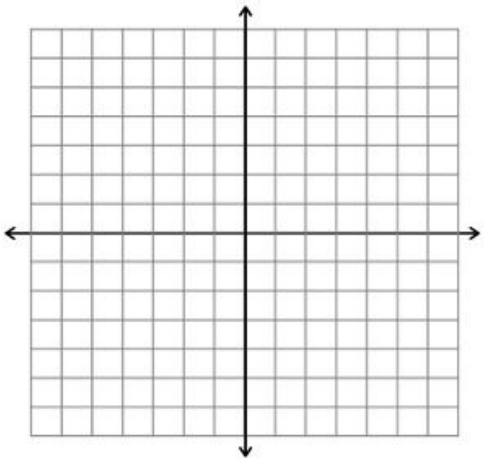
Day 14 Use the equation you wrote on Day 13 to determine how Far Alejandro walked on Thursday.

Day 15 Casey's bank statement was ripped, as shown. What is the closing balance of Casey's bank statement?



Day 16 Simplify the following expression: $3(4 + 2^3) - 9 \div 3$

Day 17 **a.** Plot and label the following points on the coordinate plane. A (-2, 4), B (-2, -3), C(5, -3)



b. Then connect the points and name the shape created.

Day 18 Slips of paper numbered 1 to 50 are placed in a hat. If a person picks a slip of paper out of the hat, what is the probability that the number on the slip ends in 4?

Day 19 Four friends earned $3 for selling seashells. How much should each friend receive if they split the money evenly? Give your answer as a decimal.

Day 20 Solve for w in the equation: $3w + 5 = 11$

Day 21 A building has a height of $16\frac{1}{4}$ meters. Each floor in the building has a height of $3\frac{1}{4}$ meters. How many floors are in the building?

Day 22 A water tank that holds 30 gallons of water when full is leaking ¾ gallon of water every hour. If no one notices and stops the leak, how many hours will it have taken for the full water tank to become empty? Show or explain your answer.

Day 23 Find the circumference and the area of the circle with radius $r = 3.2$ (Use 3.14 for π)

Day 24 Suppose a coin is tossed three times.

a) Write the sample space (list of all possible outcomes) for this event

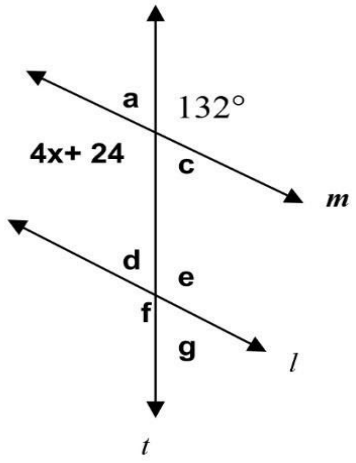
b) What is the probability that you would toss three heads in a row?

Day 25 Svetlana has the following quiz scores so far this term: 80, 86, 78, 100, 27. Find her **mean** and her **median** grade.

Day 26 Look back at the problem from day 25. Which value, the mean or the median, was more affected by the 27? Why?

Day 27 Simplify and solve the following equation. $-4b + 8(2b - 5) = -16$

Dav 28 What is the value of x in the diagram below?



Day 29 Suppose it is 58 degrees Fahrenheit at 7:00 AM between 7:00 AM and 2:00 PM, the temperature rises 23 degrees Fahrenheit, and between 2:00 PM and 6:00 PM, the temperature drops 8 degrees. What is the temperature at 6:00 PM?

Day 30 Marlee bought a large bag of Jolly Ranchers. She gave 17 pieces to her cousin and then gave 10% of what was left to her neighbor. She then ate 3 pieces and divided the rest equally among her three brothers, each of whom got 38 pieces. How many pieces did Marlee originally have? (Hint: Work Backwards)

Day 31 Last year, Maria earned $20 per hour at her job. This year, she received a 4% raise. How much will she earn for working a 7 ½ hour day at her new pay rate? Show or explain your work.

Day 32 Miguel is building a pool in his back yard that will be 20ft long, 25 feet wide, and 12 feet deep.

a) Miguel wants to paint the inside walls and the floor of the pool blue, how many square feet of paint will he need? Show or explain your work.

b) How many cubic feet of water will Miguel need to fill the pool if he wants to leave 1 ft of space at the top for splashing? Show or explain your work.

Day 33 A scale drawing of a rectangular field is 10cm by 8.5cm. If the actual field has the dimensions of 40 meters by 34 meters, what scale was used when making the drawing?

Day 34 The surface area of a cube with side s is $A = 6s^2$

a) Use the formula to find the surface area of a cube with $s = 4$.

b) Why does this formula work?

Day 35 Angle A and Angle B are complementary angles. If the measurement of angle A is 36 and angle B = 2x + 12, what is the value of x? Show your work.

Day 36 What is the product of the following numbers?

5 4 -3 ⅕ -⅓ .5

Day 37 A researcher chose a random sample of registered voters in Kentsville. He found that 3 out of every 5 voters surveyed said they would vote for Michael Miller for mayor. If there are 800 eligible voters in Kentsville, predict how many of those voters will choose Michael Miller for mayor. Show or explain your work.

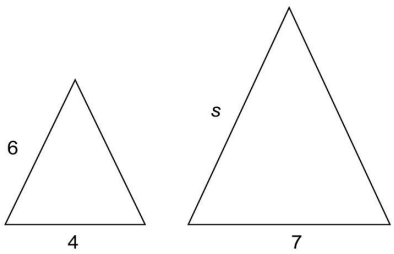
Day 38 The probability of selecting red from a bag of marbles is 64%.

a) Write the probability as a fraction.

b) Fill in the blank with either **impossible, likely, unlikely,** or **certain**. The probability of selecting a red marble is_____. Explain:

Day 39 Blockbuster Movie Store charges ten dollars for a membership fee, and an additional three dollars and fifty cents for each movie rental. Write an equation to describe the cost, C, of renting x movies including the membership fee.

Day 40 The triangles below were drawn using a certain scale factor. Use this information to solve for s.



Day 41 Mary bought 5 kids tickets for \$12.50 each and x adult tickets for \$15 each. She spent less than \$125 for all of the tickets. Write an inequality to represent the situation.

Day 42 Use your inequality equation from day 41 to answer the following question.
What is the maximum number of adult tickets that she could buy? Show or explain your answer.

Day 43 Write a mathematical expression and simplify it to find the value described below:

"The sum of 4 and 6 is divided by 2. The result is decreased by 1. This result is multiplied by 9"

Day 44 The adult population in a town in the year 2000 was 400. The population of children that same year was 120. Over the next 5 years, both populations increased by the same percent. If the new population of adults is 500, what is the new population of children? Show or explain your answer.

Day 45 The floor of a rectangular room has dimensions 22' by 16'.

a) Draw a picture to represent this room.

b) What is the area of this room?

c) How many tiles with dimension 2' by 2' would be needed to completely cover the floor of this room?

Day 46 Write an algebraic expression.

- The sum of a number x and $twenty - one$.

Day 47 Write an algebraic expression.

- The quotient of a number h and 9 is at most 28.

Day 48 Write an algebraic expression.

- Two less than three times a number x

Day 49 Write an algebraic expression.

- The fifth power of three times a number m squared.

Day 50 Write an algebraic expression.

- The difference of a number b and 7 is no less than 10 and no more than 21.

Day 51 Solve for ***m*** in the equation: $4m - 12 = -8$

Day 52 Solve for y in the equation: $7 + \frac{1}{3}y = -14$

Day 53 Solve for x in the equation: $\frac{x}{3} - 6 = 4$

Day 54 Simplify the expression: $4(3x - 5) + 10 - 2x$

Day 55 List 5 values of h that make the following inequality true: $h + 9 \geq 14$

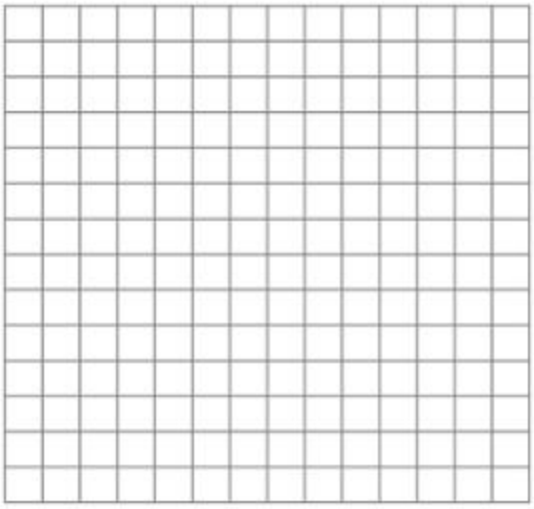
Day 56 List 5 values of m that make the following inequality true: $20 - (8 - m) < 10$

Day 57 Kelli works in the local mailroom at a college. One of her duties is to sort local mail from all of the other mail. She can sort 8 pieces of mail in 10 seconds. How many pieces should Kelli be able to sort in 45 minutes?

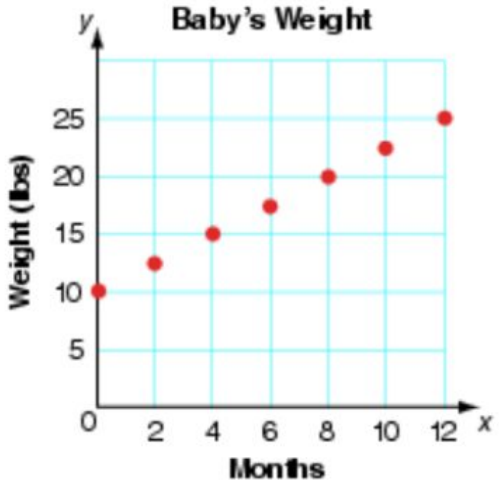
Day 58 At an aquarium the ratio of freshwater fish to saltwater fish is 3 to 5. Determine the number of each kind of fish if the aquarium has 640 fish. How many more saltwater fish are there than freshwater fish?

Day 59 A casserole has been heated to 300℉. Once the casserole is taken out of the oven, its temperature decreases 5℉ every minute. Complete the table and then make a graph showing the temperature of the casserole over time.

Number of minutes out of the oven	Temperature of the casserole
0	300
10	
20	
30	

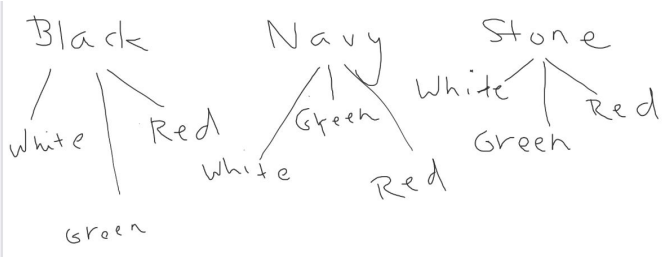


Day 60 The weight of a newborn baby increased steadily over time, as shown in the graph below. Describe the rate of the baby's weight gain over time.

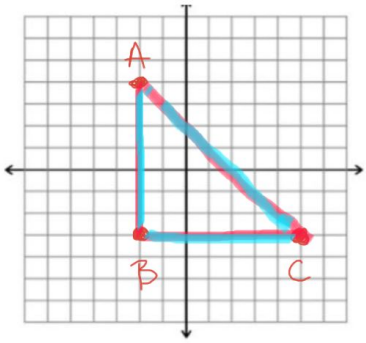


Answers:

1- $2\frac{11}{30}$
2- $x - 0.14x$
3- 30.1
4- 3
5- 48
6- *Yes*; $y = 9x$
7- 200 *miles per* 5 *gal*.
8- $40m/1g$; a unit rate is a comparison of two quantities when one of the quantities is 1. Here, 1 gallon is paired with a distance of 40 miles.
9- $d = 40g$
10- $2.4
11- Steve paid $30; Will paid $33.6
12-

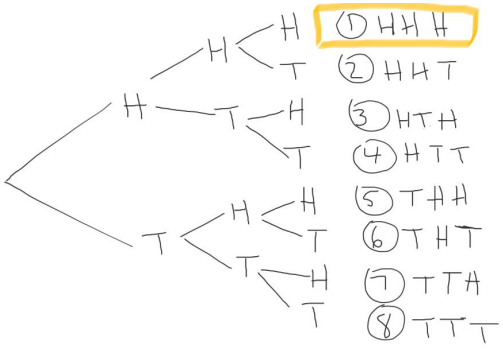


13- $3\frac{1}{4} + 2\frac{3}{4} + 3\frac{1}{2} + x = 12\frac{1}{4}$
14. $\frac{11}{4}$ *miles*
15. $140
16. 33
17. a b. right triangle



18. $\frac{1}{10}$
19. $0.75
20. w = 2
21. 5 floors
22. 40 hours
23. circumference = 10.048 units; area= 32.1536 $units^2$

24. a.



b. $\frac{1}{8}$ chance of getting 3 heads in a row

25. Mean = 74.2; Median = 80

26. The mean is more affected by the outlier 27. Extreme values influence the mean because all the numbers are added together to find the mean. The median is not affected by extreme values, or outliers, because the median is the middle number when all numbers are lined up from least to greatest. The middle number is never the highest or lowest number. In this case, the median would have been exactly the same if the lowest score were 77 instead of 27.

27. b = 2
28. x = 27
29. 73
30. 147
31. 156
32. a) 1580 sqft; b) 5,500 cubic
33. 1: 40
34. A = 96 square units; This formula works because a cube has 6 sides. Each side has an area of S *x* S *or* S^2. So the surface area is $6 \times S^2$ *or* $6s^2$.
35. x = 21°
36. 2
37. 480 voters
38. 16/25; likely
39. C = 3.5x + 10
40. s = 10.5
41. 15x + 62.5 < 125
42. 4 tickets
43. 36
44. 150 children

45. a.

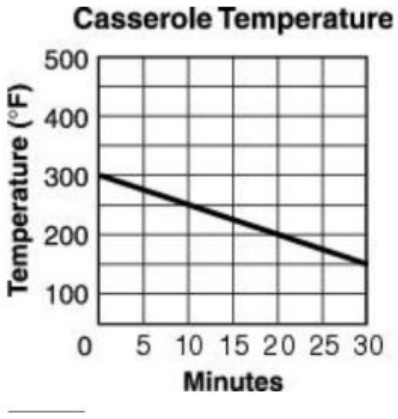
b. 352 sq. ft.

c. 88 tiles

46. $x + 21$
47. $h \div 9 \leq 28$
48. $3x - 2$
49. $(3m^2)^5$
50. $10 \leq b - 7 \leq 21$
51. $m - 1$
52. $y = -63$
53. $x = 30$
54. $10x - 10$
55. $h \geq 5$, so h can be any number larger than 5. Examples include 5.1, 6, 7, 10. 30
56. $m < -2$, so m can be number less than -2. Examples values include -2.5, -4, -5, -48
57. 2760
58. freshwater fish: 240; saltwater fish: 400
59.

Number of minutes out of the oven	Temperature of the casserole
0	300
10	250
20	200
30	150

(a)



60. The baby gained 5 lbs every 4 months (5/4 lbs/month or 1.25 lbs/month)