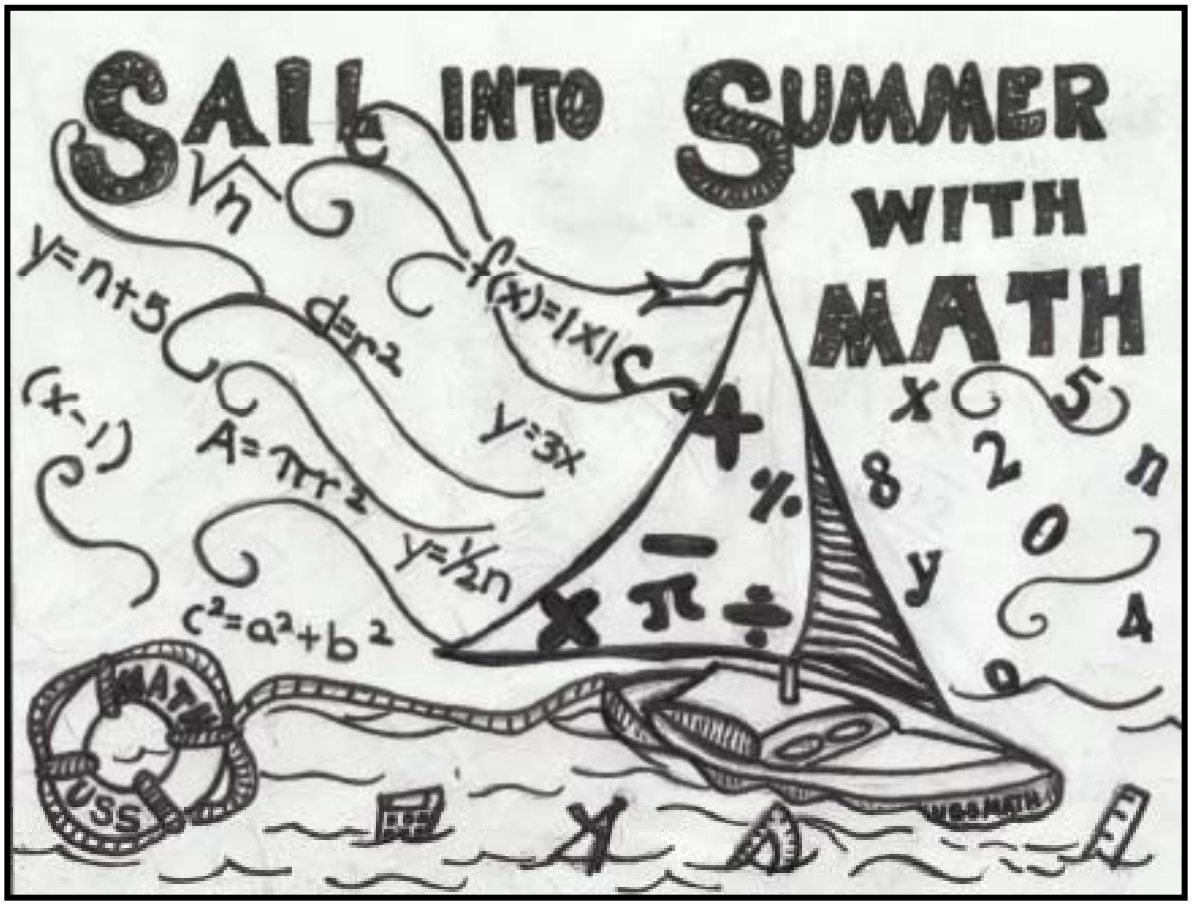
Sail into Summer with Math!



For Students Entering Investigations into Mathematics

This summer math booklet was developed to provide students an opportunity to review grade level math objectives and to improve math performance.

Student Name _____

Rename Fractions, Percents, and Decimals

Hints/Guide:

To convert fractions into decimals, we start with a fraction, such as $\frac{3}{5}$, and divide the numerator (the top number of a fraction) by the denominator (the bottom number of a fraction). So:

$$5 \overline{)\,3.0} \quad 6 \quad \text{(with } -30 \text{ and } 0\text{)}$$

and the fraction $\frac{3}{5}$ is equivalent to the decimal 0.6

To convert a decimal to a percent, we multiply the decimal by 100 (percent means a ratio of a number compared to 100). A short-cut is sometimes used of moving the decimal point two places to the right (which is equivalent to multiplying a decimal by 100, so 0.6 x 100 = 60 and $\frac{3}{5}$ = 0.6 = 60%

To convert a percent to a decimal, we divide the percent by 100, 60% ÷ 100 = 0.6 so 60% = 0.6

To convert a fraction into a percent, we can use a proportion to solve,

$\frac{3}{5} = \frac{x}{100}$, so 5x = 300 which means that x = 60 = 60%

Exercises: **SHOW ALL WORK** **No Calculators!**

Rename each fraction as a decimal:

1. $\frac{1}{5}$ =
2. $\frac{3}{4}$ =
3. $\frac{1}{2}$ =
4. $\frac{1}{3}$ =
5. $\frac{8}{10}$ =
6. $\frac{2}{3}$ =

Rename each fraction as a percent:

7. $\frac{1}{5}$ =
8. $\frac{3}{4}$ =
9. $\frac{1}{2}$ =
10. $\frac{1}{3}$ =
11. $\frac{8}{10}$ =
12. $\frac{2}{3}$ =

Rename each percent as a decimal:

13. 8% =
14. 60% =
15. 11% =
16. 12% =
17. 40% =
18. 95% =

Fraction Operations

Hints/Guide:

When adding and subtracting fractions, we need to be sure that each fraction has the same denominator, then add or subtract the numerators together. For example:

$$\frac{1}{8}+\frac{3}{4}=\frac{1}{8}+\frac{6}{8}=\frac{1+6}{8}=\frac{7}{8}$$

That was easy because it was easy to see what the new denominator should be, but what about if it is not so apparent? For example: $\frac{7}{12}+\frac{8}{15}$

For this example we must find the Lowest Common Denominator (LCM) for the two denominators. 12 and 15

12 = 12, 24, 36, 48, 60, 72, 84, ...
15 = 15, 30, 45, 60, 75, 90, 105, ...
LCM (12, 15) = 60

So, $\frac{7}{12}+\frac{8}{15}=\frac{35}{60}+\frac{32}{60}=\frac{35+32}{60}=\frac{67}{60}=1\frac{7}{60}$ Note: Be sure answers are in lowest terms

To multiply fractions, we multiply the numerators together and the denominators together, and then simplify the product. To divide fractions, we find the reciprocal of the second fraction (flip the numerator and the denominator) and then multiply the two together. For example:

$$\frac{2}{3}\bullet\frac{1}{4}=\frac{2}{12}=\frac{1}{6} \text{ and } \frac{2}{3}\div\frac{3}{4}=\frac{2}{3}\bullet\frac{4}{3}=\frac{8}{9}$$

Exercises: Perform the indicated operation: **No calculators!**
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $\frac{1}{4}+\frac{3}{5}=$
2. $\frac{6}{7}+\frac{2}{3}=$
3. $\frac{2}{5}+\frac{8}{9}=$
4. $\frac{3}{4}-\frac{2}{3}=$
5. $\frac{2}{5}-\frac{2}{9}=$
6. $\frac{9}{11}-\frac{2}{5}=$
7. $\frac{1}{3}\bullet\frac{2}{3}=$
8. $\frac{3}{4}\bullet\frac{3}{5}=$
9. $\frac{7}{8}\bullet\frac{2}{5}=$
10. $\frac{3}{8}\div\frac{3}{4}=$
11. $\frac{1}{4}\div\frac{1}{4}=$
12. $\frac{7}{11}\div\frac{3}{5}=$

Multiply Fractions and Solve Proportions

Hints/Guide:

To solve problems involving multiplying fractions and whole numbers, we must first place a one under the whole number, then multiply the numerators together and the denominators together. Then we simplify the answer:

$$\frac{6}{7} \bullet 4 = \frac{6}{7} \bullet \frac{4}{1} = \frac{24}{7} = 3\frac{3}{7}$$

To solve proportions, one method is to determine the multiplying factor of the two equal ratios. For example:

$\frac{4}{9} = \frac{24}{x}$ since 4 is multiplied by 6 to get 24, we multiply 9 by 6, so $\frac{4}{9} = \frac{24}{54}$.

Since the numerator of the fraction on the right must be multiplied by 6 to get the numerator on the left, then we must multiply the denominator of 9 by 6 to get the missing denominator, which must be 54.

Exercises: Solve (For problems 8 - 15, solve for N): **No Calculators!**
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $4 \bullet \frac{3}{4} =$
2. $\frac{1}{5} \bullet 7 =$
3. $8 \bullet \frac{1}{5} =$
4. $6 \bullet \frac{3}{7} =$
5. $\frac{4}{5} \bullet 4 =$
6. $\frac{2}{3} \bullet 6 =$
7. $7 \bullet \frac{1}{4} =$
8. $\frac{1}{5} = \frac{n}{20}$
9. $\frac{3}{n} = \frac{12}{28}$
10. $\frac{1}{n} = \frac{5}{25}$
11. $\frac{n}{4} = \frac{3}{12}$
12. $\frac{3}{7} = \frac{12}{n}$
13. $\frac{n}{9} = \frac{12}{27}$
14. $\frac{2}{3} = \frac{18}{n}$
15. $\frac{2}{7} = \frac{n}{21}$

Add Mixed Numbers

Hints/Guide:

When adding mixed numbers, we add the whole numbers and the fractions separately, then simplify the answer. For example:

$$\begin{array}{r} 4\frac{1}{3} = 4\frac{8}{24} \\ +\ 2\frac{6}{8} = 2\frac{18}{24} \\ \hline 6\frac{26}{24} = 6 + 1\frac{2}{24} = 7\frac{2}{24} = 7\frac{1}{12} \end{array}$$

First, we convert the fractions to have the same denominator, then add the fractions and add the whole numbers. If needed, we then simplify the answer.

Exercises: Solve in lowest terms: **No Calculators!**
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $\begin{array}{r} 2\frac{1}{4} \\ +\ 8\frac{1}{2} \\ \hline \end{array}$

2. $\begin{array}{r} 3\frac{8}{15} \\ +\ 7\frac{1}{3} \\ \hline \end{array}$

3. $\begin{array}{r} 3\frac{3}{5} \\ +\ 5\frac{1}{2} \\ \hline \end{array}$

4. $\begin{array}{r} 5\frac{3}{8} \\ +\ 4\frac{1}{4} \\ \hline \end{array}$

5. $\begin{array}{r} 7\frac{3}{7} \\ +\ 6\frac{1}{2} \\ \hline \end{array}$

6. $\begin{array}{r} 5\frac{5}{9} \\ +\ 1\frac{1}{3} \\ \hline \end{array}$

7. $\begin{array}{r} 4\frac{1}{3} \\ +\ 6\frac{1}{4} \\ \hline \end{array}$

8. $\begin{array}{r} 1\frac{2}{3} \\ +\ 6\frac{1}{4} \\ \hline \end{array}$

9. $\begin{array}{r} 1\frac{2}{9} \\ +\ 5\frac{2}{3} \\ \hline \end{array}$

Subtract Mixed Numbers

Hints/Guide:

When subtracting mixed numbers, we subtract the whole numbers and the fractions separately, then simplify the answer. For example:

$$\begin{array}{r} 7\frac{3}{4} = 7\frac{18}{24} \\ -\,2\frac{15}{24} = 2\frac{15}{24} \\ \hline 5\frac{3}{24} = 5\frac{1}{8} \end{array}$$

First, we convert the fractions to have the same denominator, then subtract the fractions and subtract the whole numbers. If needed, we then simplify the answer.

Exercises: Solve in lowest terms: **No Calculators!**
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $\begin{array}{r} 4\frac{1}{3} \\ -\,2\frac{1}{4} \\ \hline \end{array}$

2. $\begin{array}{r} 6\frac{3}{4} \\ -\,\frac{2}{3} \\ \hline \end{array}$

3. $\begin{array}{r} 9\frac{2}{3} \\ -\,6\frac{1}{4} \\ \hline \end{array}$

4. $\begin{array}{r} 6\frac{3}{4} \\ -\,5\frac{1}{5} \\ \hline \end{array}$

5. $\begin{array}{r} 7\frac{1}{2} \\ -\,3\frac{1}{4} \\ \hline \end{array}$

6. $\begin{array}{r} 3\frac{1}{2} \\ -\,2\frac{3}{10} \\ \hline \end{array}$

7. $\begin{array}{r} 8\frac{1}{2} \\ -\,4\frac{7}{10} \\ \hline \end{array}$

8. $\begin{array}{r} 8\frac{1}{3} \\ -\,5\frac{5}{6} \\ \hline \end{array}$

9. $\begin{array}{r} 8\frac{5}{8} \\ -\,6\frac{3}{4} \\ \hline \end{array}$

Multiply Mixed Numbers

Hints/Guide:

To multiply mixed numbers, we first convert the mixed numbers into improper fractions. This is done by multiplying the denominator by the whole number part of the mixed number and then adding the numerator to this product, and this is the numerator of the improper fraction. The denominator of the improper fraction is the same as the denominator of the mixed number. For example:

$$3\frac{2}{5} \text{ leads to } 3 \bullet 5 + 2 = 17 \text{ so } 3\frac{2}{5} = \frac{17}{5}$$

Once the mixed numbers are converted into improper fractions, we multiply and simplify just as with regular fractions. For example:

$$5\frac{1}{5} \bullet 3\frac{1}{2} = \frac{26}{5} \bullet \frac{7}{2} = \frac{182}{10} = 18\frac{2}{10} = 18\frac{1}{5}$$

Exercises: **Solve and place your answer in lowest terms:** **No Calculators!**
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $3\frac{1}{3} \bullet 4\frac{1}{2} =$
2. $2\frac{2}{3} \bullet 1\frac{1}{4} =$
3. $1\frac{1}{9} \bullet 4\frac{3}{5} =$
4. $4\frac{3}{4} \bullet 1\frac{1}{5} =$
5. $3\frac{1}{3} \bullet 6\frac{4}{5} =$
6. $6\frac{2}{3} \bullet 7\frac{3}{7} =$
7. $2\frac{4}{5} \bullet 1\frac{2}{3} \bullet 1\frac{2}{7} =$
8. $2\frac{2}{5} \bullet 4\frac{2}{7} \bullet 1\frac{1}{6} =$
9. $4\frac{1}{3} \bullet 1\frac{1}{8} \bullet \frac{8}{9} =$

Divide Mixed Numbers

Hints/Guide:

To divide mixed numbers, we must first convert to improper fractions using the technique shown in multiplying mixed numbers. Once we have converted to improper fractions, the process is the same as dividing regular fractions. For example:

$$2\frac{1}{2} \div 3\frac{1}{3} = \frac{5}{2} \div \frac{10}{3} = \frac{5}{2} \bullet \frac{3}{10} = \frac{15}{20} = \frac{3}{4} \qquad 3\frac{1}{2} \div 8\frac{2}{3} = \frac{7}{2} \div \frac{26}{3} = \frac{7}{2} \bullet \frac{3}{26} = \frac{21}{52}$$

Exercises: Solve and place your answer in lowest terms: **No Calculators!**
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $1\frac{1}{5} \div 4\frac{2}{5} =$
2. $6\frac{1}{2} \div 4\frac{2}{3} =$
3. $5\frac{1}{2} \div 6\frac{2}{3} =$
4. $\frac{8}{9} \div 2\frac{3}{5} =$
5. $3\frac{2}{3} \div 4\frac{3}{7} =$
6. $4\frac{4}{7} \div \frac{4}{9} =$
7. $6\frac{1}{5} \div 8\frac{2}{5} =$
8. $4\frac{1}{4} \div \frac{5}{7} =$
9. $6\frac{4}{7} \div 3\frac{3}{5} =$

Decimal Operations

Hints/Guide:

When adding and subtracting decimals, the key is to line up the decimals above each other, add zeros so all of the numbers have the same place value length, then use the same rules as adding and subtracting whole numbers, with the answer having a decimal point in line with the problem. For example:

$$\begin{array}{rrcrr} & 34.5 & & 34.500 & \\ 34.5 + 6.72 + 9.045 = & 6.72 & = & 6.720 & \text{AND} \quad 5 - 3.25 = \quad 5.00 \\ & \underline{+\ 9.045} & & \underline{+\ 9.045} & \qquad\qquad\qquad\quad \underline{-\ 3.25} \\ & & & 50.265 & \qquad\qquad\qquad\quad\ \ 1.75 \end{array}$$

To multiply decimals, the rules are the same as with multiplying whole numbers, until the product is determined and the decimal point must be located. The decimal point is placed the same number of digits in from the right of the product as the number of decimal place values in the numbers being multiplied. For example:

> 8.54 x 17.2, since 854 x 172 = 146888, then we count the number of decimal places in the numbers being multiplied, which is three, so the final product is 146.888 (the decimal point comes three places in from the right).

To divide decimals by a whole number, the process of division is the same, but the decimal point is brought straight up from the dividend into the quotient. For example:

$$3\overline{)\,51.06}\ =\ 17.02$$ The decimal point moves straight up from the dividend to the quotient.

Exercises: Solve: **No Calculators!**

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. 15.7 + 2.34 + 5.06 =
2. 64.038 + 164.8 + 15.7 =
3. 87.4 - 56.09 =
4. 5.908 - 4.72 =
5. 68.9 - 24.74 =
6. 955.3 - 242.7 =

7. $\begin{array}{r} .63 \\ \times\ .14 \\ \hline \end{array}$
8. $\begin{array}{r} .87 \\ \times\ 7.6 \\ \hline \end{array}$
9. $\begin{array}{r} 8.94 \\ \times\ 8.6 \\ \hline \end{array}$
10. $\begin{array}{r} 74.2 \\ \times\ .62 \\ \hline \end{array}$

11. $.35\overline{)70350}$
12. $.7\overline{)25.83}$
13. $.14\overline{)45.584}$

Percent Problems

Hints/Guide:

To determine the percent of a number, we must first convert the percent into a decimal by dividing by 100 (which can be short-cut as moving the decimal point in the percentage two places to the left). There are three types of percent problems. You can solve using an equation or a proportion. Examples: 20% of 60 = n → .2 x 60 = 12

20% of n = 12 → 12 ÷ .2 = n or $.2\overline{)12}$ = 60

n% of 60 = 12 → 12 ÷ 60 = n or $60\overline{)12}$ = .2

Exercises: Solve for n: SHOW ALL WORK No Calculators!

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. 30% of n = 135
2. 7% of 42 = n
3. 10% of 321 = n
4. 15% of 54 = n
5. 65% of n = 208
6. 80% of n = 51.2
7. 9% of 568 = n
8. 15% of 38 = n
9. 25% of n = 87
10. 85% of n = 765
11. n% of 750 = 675
12. 6% of 42 = n
13. n% of 78 = 46.8
14. n% of 480 = 19.2
15. 10% of 435 = n
16. n% of 54 = 12.96

Find Elapsed Time

Hints/Guide:

The key to understanding time problems is to think about time revolving around on a clock. If a problem starts in the morning (a.m.) and ends in the afternoon (p.m.), count the amount of time it takes to get to 12 noon, then count the amount of time it takes until the end. For example:

Joanne is cooking a large turkey and puts it in the oven at 10:15 in the morning. Dinner is planned for 4:30 in the evening and this is when Joanne will take the turkey out of the oven. How long will the turkey cook?

From 10:15 to 12:00 noon is 1 hour 45 minutes. From 12:00 noon to 4:30 p.m. is 4 hours 30 minutes. To add the times together:

$$\begin{array}{rr} & 1 \text{ h } 45 \text{ m} \\ + & 4 \text{ h } 30 \text{ m} \\ \hline & 5 \text{ h } 75 \text{ m} = 5 \text{ h} + 1 \text{ h } 15 \text{ m} = 6 \text{ h } 15 \text{ m} \end{array}$$

The turkey will cook for 6 hours and 15 minutes.

Exercises:

1. The school day begins at 7:55 a.m. and ends at 2:40 p.m. How long are you in school?

2. If you go to sleep at 9:30 p.m. and wake up at 6:30 a.m. the next morning, how long did you sleep?

3. If you want to cook a chicken that takes 4 hours and 30 minutes to completely cook and you are planning dinner for 6:00 p.m., what time do you need to start cooking the chicken?

4. If you ride your bike for 2 hours and 45 minutes and you started riding at 11:30 a.m., at what time will you finish your riding?

5. If you go to a basketball game at the MCI Center to see the Washington Wizards, and the game begins at 7:05 p.m. and ends at 10:35 p.m., how long was the game?

Solve Money Problems

Hints/Guide:

Solving money problems is merely applying the rules of decimals in a real life setting. When reading the problems, we need to determine whether we add (such as depositing money or determining a total bill), subtract (checks, withdrawals, and the difference in pricing), multiply (purchasing multiple quantities of an item), or divide (distributing money evenly, loan payments). Once we have determined which operation to use, we apply the rules for decimal operations and solve the problem and label our answer appropriately.

Exercises: **No Calculators!**

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. Frank works at Apartment Depot and earns $8.50 per hour. Last week, he worked 36 hours. What was his total pay?

2. Harry went to Rent-a-Center and rented a pneumatic nailer for $45.00, a power sander for $39.95, and a radial arm saw for $57.90. What was his total bill, excluding tax?

3. Joe is planning a trip to Houston and has calculated $450.95 for lodging, $98.00 for food, and $114.50 for gasoline. How much will his trip cost?

4. Susan has $350 in her checking account. She writes checks for $45.70 for flowers, $78.53 for books, and $46.98 for CD's. How much money is left in her checking account?

5. In order to pay off the car she bought, Lauri had to make 34 more payments of $145.98. How much does she still owe?

6. Jared earns $455.00 per week as manager of the Save-Mart. What will be his income over 12 weeks?

7. The Jennings family paid $371.40 for the year for their cable service. If their payments were the same each month, how much was their monthly bill?

Solve Problems Using Percent

Hints/Guide:

When solving percent problems, we apply the rules for finding percent of a number in realistic situations. For example, to find the amount of sales tax on a $450.00 item if the tax rate is 5%, we find 5% of 450 (.05 x 450 = 22.5), and then label our answer in dollars, getting $22.50.

Exercises: **No Calculators!**

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. Susie has just bought a pair of jeans for $45.00, a sweater for $24.00, and a jacket for $85.00. The sales tax is 5%. What is her total bill?

2. Jack bought a set of golf clubs for $250.00 and received a rebate of 20%. How much was the rebate?

3. A construction manager calculates it will cost $2,890 for materials for her next project. She must add in 10% for scrap and extras. What will be the total cost?

4. The regular price for a video game system is $164.50 but is on sale for 30% off. What is the amount of the discount?

   What is the sale price?

5. Cindy earns a 15% commission on all sales. On Saturday, she sold $980 worth of merchandise. What was the amount of commission she earned on Saturday?

6. The band had a fundraiser and sold $25,000 worth of candy. They received 40% of this amount for themselves. How much did they receive?

Mean, Median, and Mode

Hints/Guide:

We need to define some terms to solve problems involving mean, median, and mode. Mean is the sum of the numbers being considered divided by the total number of numbers being considered (also called "average"). Median is the number in the middle of the data set after the numbers have been placed in order from least to greatest. If there is an even number of elements, the median is the mean of the two numbers in the middle of the data set. The mode is the number or numbers that occur most frequently in a data set. For example, with the data set of 56, 62, 67, 45, 81, 76:

Mean is 56 + 62 + 67 + 45 + 81 + 76 = 387 and 387 ÷ 6 = 64.5, so the mean is 64.5

Median is (in order the data is 45, 56, 62, 67, 76, 81) the mean of 62 and 67, which is (62 + 67 = 129 and 129 ÷ 2 = 64.5) also 64.5.

There is no mode, because no number occurs more than once.

Exercises:

SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

You may use a calculator to identify the mean.

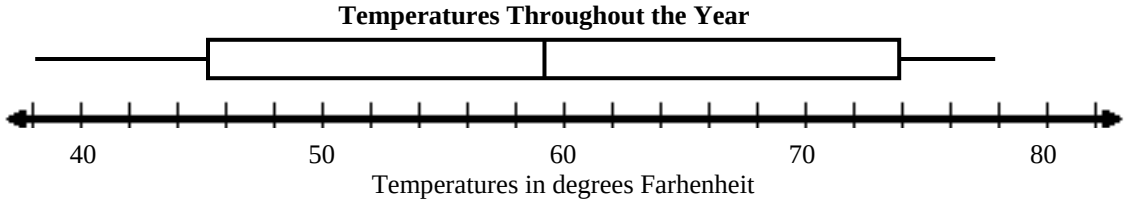
Find the mean, median, and mode of each of the following data sets:

1. 54, 65, 74, 35, 87
2. 54.6, 45.98, 67.4, 55.6, 45.7, 58.9
3. 122, 145, 156, 176, 198, 202
4. 11, 14, 16, 15, 32, 23, 27, 27, 23, 43
5. 6, 7, 8, 4, 6, 5, 8, 3, 6, 8, 5, 4
6. -4, 7, -3, 4, 8, 12, -5, -3, 8, 16, 9
7. 43, 56, 98, 67, 87
8. 12, 15, 14, 18, 33, 32, 24, 26, 27
9. Write a data set that has 7 numbers with a mode of 8 and a median of 10
10. Write a data set that has 5 numbers with a mean of 84 and a median of 86.

Box-and-Whisker Plots

Hints/Guide:

To make a box and whisker plot using the data 38, 78, 74, 48, 77, 59, 66, 70, 45, 56, and 38 (temperature data), we first arrange the data in numerical order. Next, we find the median of the data set (59). Then, we find the median of all of the numbers less than the median of the total data set (45). This is called the lower quartile. Now, we find the median of the numbers greater than the overall median (74). This is called the upper quartile. The smallest and largest data elements are called the lower extreme and the upper extreme, respectively. Draw a scale line which covers the least and greatest elements in your data and mark it in even increments. Plot the three medians and the two extremes above the scale line. Draw the "box and whiskers" by drawing a box between the upper and lower quartiles and mark the median with a line inside the box. Then draw a line from each side of the box to each of the two extremes. Title your graph and the scale line.

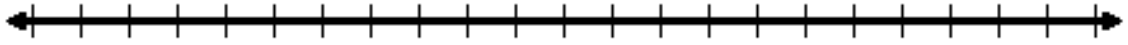


Exercises: Make a box-and-whisker plot from each of the following data sets.

1. 84, 95, 70, 63, 46, 75, 98, 92, 87, 89, 94, 90, 79, 88, 83 (Test scores)

2. 29, 34, 45, 48, 38, 42, 29, 26, 34, 45, 38 (February temperatures)

3. 34, 42, 32, 26, 56, 53, 47, 35, 24, 26, 25, 34, 26, 24, 36 (Weights of dogs)



Integers I

Hints/Guide:

To add integers with the same sign (both positive or both negative), add their absolute values and use the same sign. To add integers of opposite signs, find the difference of their absolute values and then take the sign of the larger absolute value.

To subtract integers, add its additive inverse.

For example 6 - 11 = a becomes 6 + -11 = a and solves as -5 = a.

Exercises: Solve the following problems: **No Calculators!**

1. 6 + (-7) =
2. (-4) + (-5) =
3. 6 + (-9) =
4. (-6) - 7 =
5. 6 - (-6) =
6. 7 - (-9) =
7. 5 + (-8) =
8. -15 + 8 =
9. 14 + (-4) =
10. -9 - (-2) =
11. -7 - 6 =
12. -8 - (-19) =
13. 29 - 16 + (-5) =
14. -15 + 8 - (-19) =
15. 45 - (-13) + (-14) =
16. -15 - 6 - 9 =
17. -7 + (-6) - 7 =
18. 29 - 56 - 78 =
19. 17 + (-7) - (-5) =
20. 45 - (-9) + 5 =

Integers II

Hints/Guide:

The rules for multiplying integers are:

Positive x Positive = Positive	Negative x Negative = Positive
Positive x Negative = Negative	Negative x Positive = Negative

The rules for dividing integers are the same as multiplying integers.

Exercises: Solve the following problems: **No Calculators!**

1. $4 \cdot (-3) =$
2. $(-12) \cdot (-4) =$
3. $(-8)(-3) =$
4. $\frac{-14}{2} =$
5. $\frac{28}{-4} =$
6. $\frac{-36}{-6} =$
7. $6\ (-5) =$
8. $8\ (-4 - 6) =$
9. $-6\ (9 - 11) =$
10. $\frac{(-5)(-6)}{-2} =$
11. $\frac{6(-4)}{8} =$
12. $\frac{-56}{2^3} =$
13. $\frac{-6-(-8)}{-2} =$
14. $-7 + \frac{4+(-6)}{-2} =$
15. $45 - 4\ (5 - (-3)) =$
16. $(-4 + 7)\ (-5 + 3) =$
17. $16 - (-3)\ (-7 + 5) =$
18. $\frac{4+(-6)-5-3}{-6+4} =$
19. $(-2)^3(-5-(-6)) =$
20. $13\ (-9 + 7) + 4 =$

Solving Equations I

Hints/Guide:

The key in equation solving is to isolate the variable, to get the letter by itself. In one-step equations, we merely undo the operation - addition is the opposite of subtraction and multiplication is the opposite of division. Remember the golden rule of equation solving: If we do something to one side of the equation, we must do the exact same thing to the other side. Examples:

1. $x + 5 = 6$
   $\underline{-5 \quad -5}$
   $x = 1$
   Check: $1 + 5 = 6$
   $6 = 6$

2. $t - 6 = 7$
   $\underline{+6 \quad +6}$
   $t = 13$
   Check: $13 - 6 = 7$
   $7 = 7$

3. $\frac{4x}{4} = \frac{16}{4}$
   $x = 4$
   Check: $4(4) = 16$
   $16 = 16$

4. $6 \cdot \frac{r}{6} = 12 \cdot 6$
   $r = 72$
   Check: $72 \div 6 = 12$
   $12 = 12$

Exercises: Solve the following problems: **No Calculators!**
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $x + 8 = 13$
2. $t - 9 = 4$
3. $4t = -12$
4. $\frac{r}{4} = 24$
5. $y - 4 = 3$
6. $h + 8 = 5$
7. $\frac{p}{8} = -16$
8. $-5k = 20$
9. $9 - p = 17$

Solving Equations II

Hints/Guide:

The key in equation solving is to isolate the variable, to get the letter by itself. In two-step equations, we must undo addition and subtraction first, then multiplication and division. Remember the golden rule of equation solving: If we do something to one side of the equation, we must do the exact same thing to the other side. Examples:

1. $4x - 6 = -14$

$+6 \quad +6$

$\frac{4x}{4} = \frac{-8}{4}$

$x = -2$

Solve: $4(-2) - 6 = -14$

$-8 - 6 = -14$

$-14 = -14$

2. $\frac{x}{-6} - 4 = -8$

$+4 \quad +4$

$-6 \bullet \frac{x}{-6} = -4 \bullet -6$

$x = 24$

Solve: $(24/-6) - 4 = -8$

$-4 - 4 = -8$

$-8 = -8$

Exercises: Solve the following problems: **No Calculators!**
SHOW ALL WORK. Use a separate sheet of paper (if necessary) and staple to this page.

1. $4t - 6 = 22$
2. $\frac{m}{-5} + 6 = -4$
3. $-4r + 5 = 25$
4. $\frac{x}{3} - 7 = 6$
5. $5g + 3 = -12$
6. $\frac{y}{-2} + (-4) = 8$

Geometry I

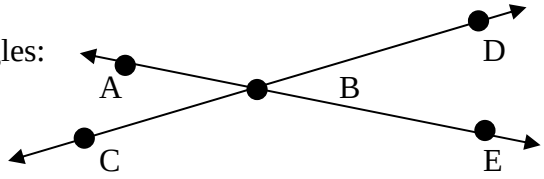
Hints/Guide:

In order to learn geometry, we first must understand so geometric terms:

Right Angle - an angle that measures 90 degrees.
Acute Angle - an angle that measures less than 90 degrees.
Obtuse Angle - an angle that measures more than 90 degrees, but less than 180 degrees.
Complementary - two angles that add together to equal 90 degrees.
Supplementary - two angles that add together to equal 180 degrees.
Vertical - Angles which are opposite from each other.
Adjacent - angles that are next to each other.

When two lines intersect, they form four angles:

$\angle ABC$ $\angle ABD$
$\angle DBE$ $\angle EBC$



Vertical angles, such as $\angle ABC$ and $\angle DBE$, are equal in measure and adjacent angles, such as $\angle ABD$ and $\angle DBE$, are supplementary.

Exercises:

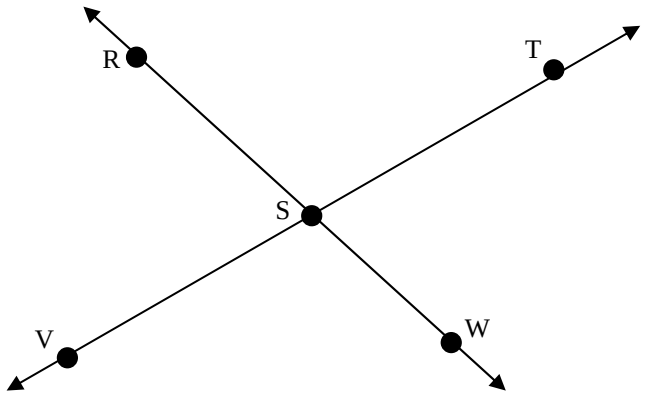
1. In the above example, list two acute angles and two obtuse angles

   Acute _____, _____ Obtuse _____, _____

2. If you have a 43º angle, what is the measure of the angle which is complementary to it?

3. If you have a 43º angle, what is the measure of the angle which is supplementary to it?

4. Using the figure, list two pairs of vertical angles and two pairs of adjacent angles.



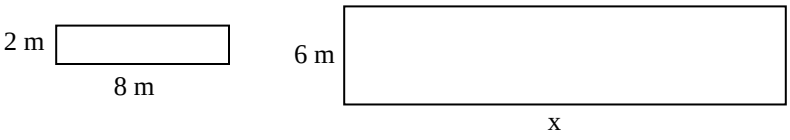
Geometry II

Hints/Guide:

In order to add to our knowledge of geometry, here are some additional terms:

Congruent - two figures which are the same shape and the same size.
Similar - two figures which are the same shape but different size.

In similar triangles, congruent angles in the same location in the figure are called corresponding angles. The sides opposite corresponding angles are called corresponding sides. The measures of corresponding angle or of corresponding sides of similar triangles are proportional. For example:

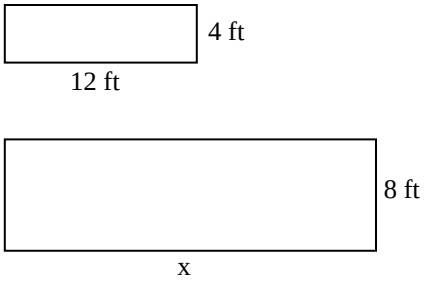


$\frac{2}{6} = \frac{8}{x}$ so since 2x = 48

x = 24 m

Exercises: Solve for the indicated variables (All figures are similar): **SHOW YOUR WORK!**

1.



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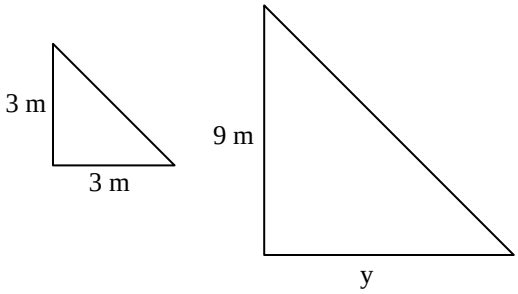

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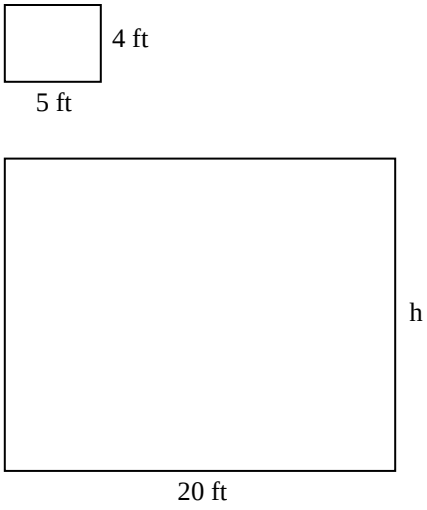

4.