M-Step Study Guide:

Geometry: Formulas: **Area of square/rectangle/ parallelogram**-- *lw* (length times width)

Area of triangle-1/2 *bh* (one-half time base times height)

Area of Circle- πr^2 (pi times the radius squared-pi = 3.14, the radius is halfway across the circle)

Area of trapezoid-$1/2(b_1 + b_2)h$

Surface Area-Find the area of each face and then add them all.

Volume-Rectangle-*lwh* (length times width times height)

Expressions and Equations: Variables are letters that represent something we don't know. You may be asked to replace the variable with a particular value, then just solve the equation.

One-Step equations: x + 5 = 12; subtract 5 from both sides; x = 7

X – 5 = 12; add 5 to both sides- x = 17

5x = 30; divide both sides by 5; x = 6

x/5 = 30; multiply both sides by 5; x = 150

Ratio and Proportion Language-there are _____for every _____. The first item goes with the first number, the second item goes with the second number.

Remember-You can write ratios as fractions and discover the missing value by cross multiplying and dividing. Ex- $\frac{4}{\_\_\_\_\_}$ $\frac{64}{X}$ 32 4 times 32 = 128, 128 divided by 64 = 2 so x = 2

To find equivalent ratios -multiply or divide BOTH numbers by the same number. Ex-2 to 6 equivalents could be 1 to 3 (divided both numbers by two-they must share a factor to do this) or 4 to 12 (multiplied both numbers by two).

To find UNIT rates-divide the number by what you want ONE of; example-$6.93 for 3 candy bars; how much for ONE candy bar-divide 6.93 by 3 = $2.31 per candy bar

Percent of a number: ex-what is 6% of36; $\frac{x}{36}$ $\frac{6...}{100}$ so 36 times 6 = 216, 216 divided by 100 = 2.16

X = 2.16

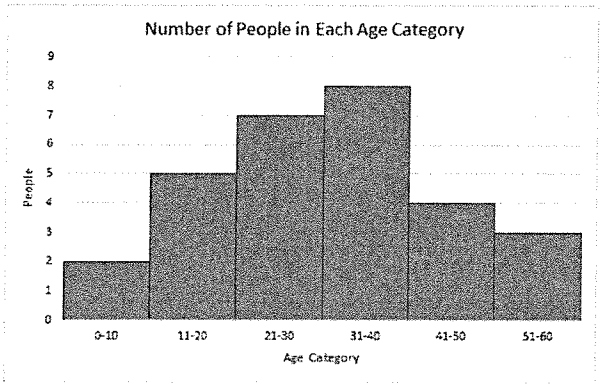
2.16 is what percent of 36; $\frac{2.16}{36}$ $\frac{x...}{100}$ 2.16 x 100 = 216, divide by 36 = 6

x = 6

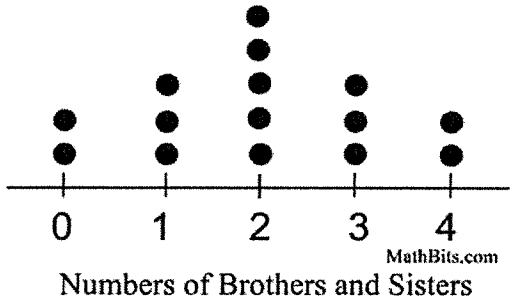
2.16 is 6% of what number; $\frac{2.16}{X} = \frac{6...}{100}$ 2.16 x 100 = 216, divide by 6 = 36

x = 36

Statistics and Probability-Remember to read EVERY WORD of the graph or chart. Read the words and numbers along the x-axis (the bottom of the chart) and all the words and numbers along the y-axis (the side of the chart). Look at the intervals (the spacing) of the chart.



In this chart, the intervals are 10 years (age category along the x-axis), the y-axis (the side) tells you the number of people in that age range. You can tell the 31-40 years old has the most people just by looking but you can also see that this age range contains 8 people by looking at the y-axis. Altogether there are 29 people represented on this chart-you find this by adding all the bars together.



Numbers of Brothers and Sisters

In this graph, there is no y-axis but each dot (or x) counts as one person. So, across the x-axis (the bottom) it tells you the graph is showing the number of brothers and sisters. You can count how many people have 2 brothers/sisters by counting the dots above the 2. In this case there are 5 people with 2 brothers/sisters. All together there were 15 who answered the question "How many brothers or sisters do you have?" The total was found by counting ALL the dots.

MEAN-All up all the numbers and then divide by how many numbers you added. Using the dot plot above you would add 0 + 0 + 1 + 1 + 1 + 2 + 2 + 2 + 2 + 2 +3 + 3 +3 + 4 + 4 = 33; divide 33 by 15 = 2.2 so The average of this data is 2.2 (BUT, you can't have a fractional brother or sister so the average number of brothers or sisters people have is 2)

MEDIAN-The middle number. You must FIRST put the numbers is ORDER from least to greatest and then find the middle number.
Using the DOT PLOT above the numbers in order would be 0 0 1 1 1 2 2 2 2 2 3 3 3 4 4. The middle number is 2. If the middle is between two numbers, find the MEAN of those two numbers.

MODE-The number that occurs the most. In the DOT PLOT the number that appears the most is 2.

Number Systems-Add/Subtract Fractions. Get a common denominator. Do not change mixed numbers to improper. Add/Subtract the numerators; keep the denominator; add/subtract any whole numbers; reduce/simplify as needed. **Multiply Fractions**-Change all mixed numbers to improper fractions (multiply the whole number by the denominator, add the numerator-this is your new numerator, the denominator does not change), multiply numerator by numerator/denominator by denominator; reduce as needed/simplify. **Divide Fractions**-Change all mixed numbers to improper fractions, **KEEP** the first fraction, **change** division to multiplication, **flip** the second fraction; then multiply numerator by numerator and denominator by denominator, reduce/simplify as needed.

Decimals-Add/Subtract decimals-line up the decimals and then add or subtract as usual, be sure to drop the decimal down into the answer. **Multiply Decimals**-ignore the decimals and just multiply like usual, when done count how many numbers are behind the decimal(s) in the problem and make sure there are that many numbers behind the decimal in your answer. **Divide Decimals**-You must first move the decimal in the DIVISOR (if there is one) all the way to the right, then move the decimal in the DIVIDEND the same number of places you moved the decimal in the divisor. Bring the decimal up, divide like usual.

GCF-the biggest factor two or more numbers have in common. Use the prime factorization tree.
LCM-The smallest multiple two or more numbers have in common. Use the factor tree but write out the prime factorization using exponents.

Ex-

GCF: $8 = 2 \times 2 \times 2$
$14 = 2 \times 7$ The GCF is 2, that is the only number they both share.

LCM: $8 = 2^3$
$14 = 2 \times 7$ The LCM is 56, that is the smallest multiple they can both go into.