

NAME _____
DATE _____

COS AM or PM

RATIOS AND PROPORTIONS

A **ratio** is an expression of comparison between two numbers. A ratio is usually written as one number before another with a colon in between. A ratio may also be expressed as a fraction or a decimal. The relationship between 1 and 4 can be written as 1:4 (ratio), $\frac{1}{4}$ (fraction), or .25 (decimal).

A **proportion** expresses the relationship between two ratios. It is written as two ratios with an equal sign between. For example, $2:7 = 6:21$. The four numbers in the proportion have special names. The two outer numbers, in this case 2 and 21 are called the **extremes**. The two inner numbers are 7 and 6 are called the **means**.

$$\begin{aligned} \text{Extremes:Means} &= \text{Means:Extremes} \\ 2:7 &= 6:21 \end{aligned}$$

Solve for x in the following proportions.

1. $4:5 = 12:x$

check:

2. $8:x = 28:7$

check:

3. $4.5:5 = x:10$

check:

4. $7:x = 21:24$

check:

What Does All This Mean To You?

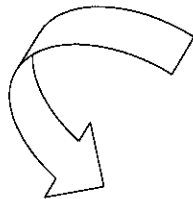
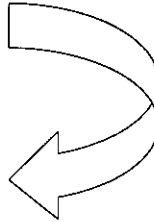
USING PROPORTIONS

If you know that a proportion is true, you can solve for a missing part. This is very useful in the cosmetology field because it helps you prepare various solutions and mixtures. For example, if you know that a cleaning solution requires 3 parts water to 2 parts chemical, you can determine how to mix the solution.

$$3 : 2 = \text{water} : \text{chemical}$$

Mentally

3 oz water : _____ chemical
6 oz water: _____ chemical
_____ water: 10 oz chemical
_____ water: 4 pints chemical



Mathematically

Ex.

A cleaning solution is mixed 3 parts water to 2 parts chemical. You have 5 oz of chemical. How much water should you mix with this chemical?

Ex.

You need 2 ounces of solution to color a client's hair. The color you are using is mixed 4 parts peroxide to 1 1/2 part water? How much peroxide and water do you need to mix to make this solution?

NAME _____ COS AM or PM DATE _____

RATIOS AND PROPORTION

1. Grace needs to prepare a facial solution that requires 6 parts cold cream to 1 part water. How much water does she need to add to 16 oz. of cold cream?
2. Sam makes a solution requiring $1\frac{1}{2}$ parts developer to 1 part color. If she plans to 8 oz of color, how much developer will she need?
3. You need to mix 3 ounces of color which is mixed $1\frac{1}{2}$ parts color to 2 parts developer. How much developer must you mix with the 3 ounces of color?
4. A cleaning solution you are using is mixed 3 parts concentrate to 1 part water. You will need 6 ounces of this solution how much concentrate and how much water do you need to add?
5. You need 4 ounces of solution to color a client's hair. The color you are using is mixed 4 parts peroxide to $1\frac{1}{2}$ part water? How much peroxide and water do you need to mix to make this solution?