## Section 6.3  Proportions

**1.  Definition of a Proportion**:  A statement that two ratios are equal is called a proportion.  If $\dfrac{a}{b}$ and $\dfrac{c}{d}$ are two equal ratios, then the statement

$$\frac{a}{b} = \frac{c}{d}$$

is called a proportion. The "a" is the first term, "b" is the second term, "c" is the third term, and "d" is the fourth term.  The **extremes** are the first and fourth terms and the **means** are the second and third terms.

> Example 1: Name the means and the extremes in the given proportion.
>
> $$\frac{5}{10} = \frac{6}{12}$$

**2.  Fundamental Property of Proportions**:  If $\dfrac{a}{b} = \dfrac{c}{d}$, then ad = bc.

So, in any proportion the product of the means equals the product of the extremes.

> Example 2: Verify that the given statements are proportions:
>
> a. $\dfrac{8}{12} = \dfrac{10}{15}$
>
> b. $\dfrac{\left(\dfrac{3}{5}\right)}{\left(\dfrac{7}{10}\right)} = \dfrac{\left(\dfrac{20}{7}\right)}{\left(\dfrac{10}{3}\right)}$

Example 3: Solve the proportion by finding the missing term.

a. $\dfrac{2}{3} = \dfrac{4}{x}$

b. $\dfrac{0.4}{1.2} = \dfrac{1}{x}$

c. $\dfrac{n}{10} = \dfrac{\left(\dfrac{3}{5}\right)}{\left(\dfrac{3}{8}\right)}$

**3. Applications of Proportions:** To set-up a proportion, let the first ratio compare two quantities in the first "situation", then let the second ratio compare "like" quantities in the second situation.

> Example 4: In the first of 4 games of the season, a football team scores 68 points. At this rate, how many points will the team score in all 11 games?

Practice Problems:

Solve the proportion by finding the missing term.

a. $\dfrac{5}{4} = \dfrac{10}{x}$

b. $\dfrac{0.2}{0.6} = \dfrac{4}{x}$

Solve the following application problems by setting up a proportion and then solving it.

    c.  If 12 oz. of a cereal contains 4 grams of sugar, how many grams of sugar are contained in 42 oz. of cereal?

    d.  An 8 oz. serving of a certain cereal contains 256 calories. How many calories are contained in a 20 oz. serving?

Answers to Practice Problems:
       a. {8};  b. {12};  c. 42 oz. of cereal contains 14 g. of sugar;  d. A 20 oz. serving of cereal contains 640 calories.

Note:  Portions of this document are excerpted from the textbook *Prealgebra*, 7th ed. by Charles McKeague