

## Geometry - 6.1 - Proportions

- A ratio is a comparison of two quantities. The ratio of a to b can be expressed as  $\frac{a}{b}$  or a:b.

**Ex 1** - A certain school has 12 classes of geometry this year. There are a total of 317 students taking geometry at the school. Find the ratio of students per geometry class at the school to the nearest tenth.

$$\frac{\text{Total \# of Students}}{\text{Total \# of classes}} = \frac{317 \text{ students}}{12 \text{ classes}} = 26.4 \frac{\text{students}}{\text{Class}}$$

- An extended ratio can be used to compare 3 or more numbers. An extended ratio comparing the numbers a, b, and c would be written in the form a:b:c.

**Ex 2** - In a quadrilateral, the ratio of the measures of the four sides is 2:3:4:6, and its perimeter is 150 cm. Find the length of the shortest side in the quadrilateral.

$$2x + 3x + 4x + 6x = 150$$

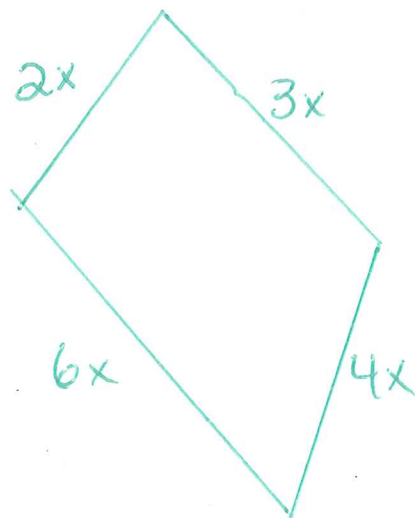
$$\frac{15x}{15} = \frac{150}{15}$$

$$x = (10)$$

Shortest side:  $2x$

$$2(10)$$

$$20 \text{ cm}$$



- An Equation stating that two ratios are equal is called a proportion.

**Ex 3** - Solve each proportion.

a)  $\frac{6}{11} = \frac{x}{55}$  (cross multiply)

$$11 \cdot x = 6 \cdot 55$$

$$\frac{11x}{11} = \frac{330}{11}$$

$$x = 30$$

b)  $\frac{8}{2x+9} = \frac{-3}{4}$

$$-3 \cdot (2x+9) = 8 \cdot 4$$

$$-6x - 27 = 32$$

$$-6x = 59$$

$$x = \frac{59}{-6}$$

**Ex 4** - Derek is creating a scale model for his ant colony to live in. The model has a width of 21 inches and a length of 39 inches. If the actual building has a width of 63 inches, find the actual building's length.

$$\frac{\text{Model width}}{\text{Model length}} = \frac{\text{actual width}}{\text{actual length}}$$

$$\frac{21 \text{ inches}}{39 \text{ inches}} = \frac{63 \text{ inches}}{x}$$

$$21x = 39 \cdot 63$$

$$\frac{21x}{21} = \frac{2,457}{21}$$

$$x = 117 \text{ inches} = \text{actual building length}$$