RATIOS AND PROPORTIONS

Ratios

When you are given a ratio such as 2 : 3 : 5, put an x after each number ($2x$, $3x$, and $5x$) and set up an equation.

1) In a certain Math A class, the ratio of the number of girls to the number of boys is 3 : 5. If there are a total of 32 students in this class, how many are girls and how many are boys?

The number of girls is $3x$ and the number of boys is $5x$. Since the total number of students (girls + boys) is 32, set up the equation:

$$3x + 5x = 32$$

$$\frac{8x}{8} = \frac{32}{8}$$

$$x = 4$$

Substitute to find the answer: Number of Girls $= 3x = 3(4) = 12$

Number of Boys $= 5x = 5(4) = 20$

2) The angles in a triangle are in the ratio of 1 : 3 : 5. Find the number of degrees in the largest angle in the triangle.

The three angles are $1x$, $3x$, and $5x$. Since the angles of a triangle add up to 180°, set up the equation:

$$1x + 3x + 5x = 180$$

$$\frac{9x}{9} = \frac{180}{9}$$

$$x = 20$$

Since $5x$ is the largest angle, substitute to find the answer: $5x = 5(20°) = 100°$

Proportions

Match up like parts (ex. $\frac{\text{miles}}{\text{hours}} = \frac{\text{miles}}{\text{hours}}$).

1) If four compact discs cost $27, at the same rate what is the cost of seven compact discs?

$$\frac{\text{CDs}}{\text{dollars}} \qquad \frac{4}{27} = \frac{7}{x}$$

$$\frac{4x}{4} = \frac{189}{4}$$

$$x = 47.25$$

$47.25

2) At a certain time during the day, light falls so that a pole 10 feet in height casts a shadow 15 feet in length on level ground. At the same time, a man casts a shadow that is 9 feet in length. How tall is the man?

$$\frac{\text{height}}{\text{shadow}} \qquad \frac{10}{15} = \frac{x}{9}$$

$$\frac{90}{15} = \frac{15x}{15}$$

$$x = 6$$

The man is 6 feet tall.