GET TO KNOW THE UNKNOWN MULTIPLIER.

Solve the following problems by finding the unknown multiplier and then solving for the missing information.

1. The ratio of the glass beads to wooden beads is 6:11 in a container of 51 beads. How many glass beads are in the container?

   U.M. = _____   glass beads = _____

2. During the 2004 - 2005 session, the U.S. Supreme Court reversed 16 of 19 decisions from a circuit court. At this rate, how many rulings would be reversed if the court reviewed 114 cases?

   U.M. = _____   reversed cases = _____

3. Virginia and Keith have been collecting donations for their local soup kitchen. The ratio of Virginia's donations to Keith's donations is 8:5. If Keith has collected $110.00 in donations, how many dollars has Virginia collected?

   U.M. = _____   Virginia donation = _____

4. The ratio of blondes to brunettes in a sorority is 5:3. If there are currently 56 women in the sorority, how many brunettes must be invited to join in order to bring the ratio of blondes to brunettes to 1:1?

   U.M. = _____   brunettes = _____

TRICKY TRIPLE RATIOS: Sometimes you'll be given two separate ratios and asked to find a third one based on the first two. This can be tricky, but it's doable if you're careful. For example:

(Ex:) If the ratio of b to c is 6 to 5, and the ratio of a to b is 7 to 3, what is the ratio of c to a?

Method #1

1. Use translation to carefully set up the ratios:

$$\frac{b}{c} = \frac{6}{5} \quad \text{and} \quad \frac{a}{b} = \frac{7}{3}$$

2. Multiply the ratios together:

$$\frac{b}{c} \times \frac{a}{b} = \frac{ba}{bc} = \frac{a}{c}$$

3. Do the same with the numbers above:

$$\frac{6}{5} \times \frac{7}{3} = \frac{42}{15} = \frac{a}{c}$$

4. Flip the fraction, because we're looking for $(\frac{c}{a})$, not $(\frac{a}{c})$.

$$\frac{15}{42} = \frac{c}{a} = \text{the ratio of } c \text{ to } a$$

5. Finally, we need to reduce the fraction:

$$\frac{15}{42} = \frac{5}{14}$$

There is, of course, more than one method to solve this problem. Use whichever method you find more comfortable.

(Ex:) If the ratio of b to c is 6 to 5, and the ratio of a to b is 7 to 3, what is the ratio of c to a?

Method #2

1. Use translation to carefully set up the ratios:

$$\frac{b}{c} = \frac{6}{5} \quad \text{and} \quad \frac{a}{b} = \frac{7}{3}$$

2. Cross multiply and isolate the variable b that you can later substitute into the other equation:

$$\frac{b}{c} = \frac{6}{5} \implies 6c = 5b \implies b = \frac{6}{5}c$$
$$\frac{a}{b} = \frac{7}{3} \implies 3a = 7b$$

3. Plug it in and solve:

$$3a = 7(\frac{6}{5}c)$$
$$3a = \frac{42}{15}c$$
$$a = \frac{42}{15}c \implies \frac{a}{c} = \frac{42}{15}$$

4. Flip the fraction because we're looking for $(\frac{c}{a})$, not $(\frac{a}{c})$. $\frac{a}{c} = \frac{42}{15} \implies \frac{15}{42} = \frac{c}{a}$

5. Finally, we need to reduce the fraction:

$$\frac{c}{a} = \frac{15}{42} = \frac{5}{14}$$

1

Sarah typed $\frac{2}{5}$ of a book, Jaime typed $\frac{3}{7}$, and Rosie the rest. What is the ratio of number of pages Sarah typed to the number of pages Jaime typed to the number of pages Rosie typed?

A) $14 : 15 : 6$

B) $15 : 14 : 6$

C) $14 : 12 : 6$

D) $14 : 5 : 16$

2

The elevation of a mountain peak, in meters, is approximately 20% less than that of a nearby peak. The elevation of the nearby peak is 6195 meters. Which of the following is the best approximation of the elevation, in meters, of the unknown mountain peak?

A) 4865

B) 4950

C) 5000

D) 5155

3

At a certain school $\frac{1}{3}$ of incoming freshmen spoke a foreign language fluently. By their junior year, an additional 30 students had become fluent in a foreign language, raising the number to $\frac{1}{2}$ of all juniors. Assuming all the original freshmen remained enrolled as juniors and no additional students enrolled, how many students are in the junior class?

A) 90

B) 120

C) 180

D) 240

4

Workers fixing a sidewalk need 80 gallons of water and 60 pounds of cement mix to make 20 feet of new sidewalk. If these same proportions are to be used to make 11 feet of new sidewalk, how many gallons of water will be needed?