

Algebra Foundational Skill 2: Solving Proportions

Focus Question: How can I efficiently solve proportions?

- A. Your 7th grade strategy works... on easy problems
Find the value of x in each of the following proportions

1. $\frac{2.4}{5} = \frac{x}{20}$

$x = 8$

2. $\frac{8}{3} = \frac{16}{x}$

$x = 6$

3. $\frac{4}{9} = \frac{32}{x}$

$x = 72$

4. What was your strategy?

Found the scale factor

- B. The need for a new strategy....
Use your same strategy to solve the following for x.

1. $\frac{3}{5} = \frac{x}{27}$

$5 \cdot ? = 27$

2. $\frac{7}{6} = \frac{3}{x}$

3. $\frac{x}{6} = \frac{4}{25}$



4. Is your same strategy EFFICIENT? No

5. In algebra 1 we will get to $\frac{x+6}{2} = \frac{x-7}{9}$ or $\frac{x+1}{x-3} = \frac{x+2}{7}$. Will your strategy still be efficient? No!

- C. The new strategy... Cross multiply

1. Do NOT get it confused with multiply across.... When do we multiply across?

when multiplying fractions

2. Cross Multiply is for solving proportions which means two fractions have been set equal!

$\frac{1}{6} \cdot \frac{9}{4}$

you will multiply across

$\frac{1}{6} = \frac{9}{4}$

you will cross multiply

these are not really equal

Where it comes from....**common denominators**. We'll do part B #1

$$\frac{3}{5} \times \frac{x}{27}$$

5 times 27 is 135, so that is the common denominator.

$$\frac{27}{27} \cdot \frac{3}{5} = \frac{x}{27} \cdot \frac{5}{5}$$

$$\frac{27 \cdot 3}{135} = \frac{x \cdot 5}{135}$$

Both fractions get multiplied by 1 in a really strangely written way. But remember that multiplying by 1 does NOT change the value. This will create the common denominator of 135. The numerators have left the way they are on purpose.

Because the denominators are equal, the numerators must also be equal so... $27 \cdot 3 = x \cdot 5$

3. Go up to the original proportion and connect the 27 and the 3.
4. In the original proportion, connect the x and the 5.
5. Why do you think this strategy is called cross multiply?

$$\frac{81}{5} = \frac{5x}{5}$$

$$x = \frac{81}{5}$$

b/c it makes an x through the = sign

D. Let's practice:

Solve each of the following for x.

$$1. \frac{2}{5} \times \frac{12}{x}$$

(This one is so you can trust that it works!)

$$2 \cdot x = 5 \cdot 12$$

$$\frac{2x}{2} = \frac{60}{2}$$

$$x = 30$$

$$2. \frac{4}{7} \times \frac{6}{x}$$

$$4 \cdot x = 7 \cdot 6$$

$$\frac{4x}{4} = \frac{42}{4}$$

$$x = \frac{42}{4}$$

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

$$3. \frac{12}{5} \times \frac{x}{8}$$

$$12 \cdot 8 = 5 \cdot x$$

$$\frac{96}{5} = \frac{5x}{5}$$

$$x = \frac{96}{5}$$