Name: _____

2c.4 Assignment (distance version)
Math 9 – Wolfe

Solving proportions

Consider watching https://www.khanacademy.org/math/pre-algebra/pre-algebra-ratios-rates/pre-algebra-write-and-solve-proportions/v/find-an-unknown-in-a-proportion

You may also want to do the practice for this section on the Khan Academy website (look at the menu bar on the left.)

The **essential learning** component to unit 2c.4 is only the first video and practice (and the worked out example below in the notes.) I recommend students looking for **enrichment** continue on and do the entire set of videos and exercises for Writing and Solving Proportions – but don't worry too much if you a little overwhelmed with the last couple of sections involving multiple units.

Notes:

This is a review of something you already know how to do, but it is an EXTREMELY powerful tool for solving proportions of all types. You can also use this to solve for a variable in the denominator.
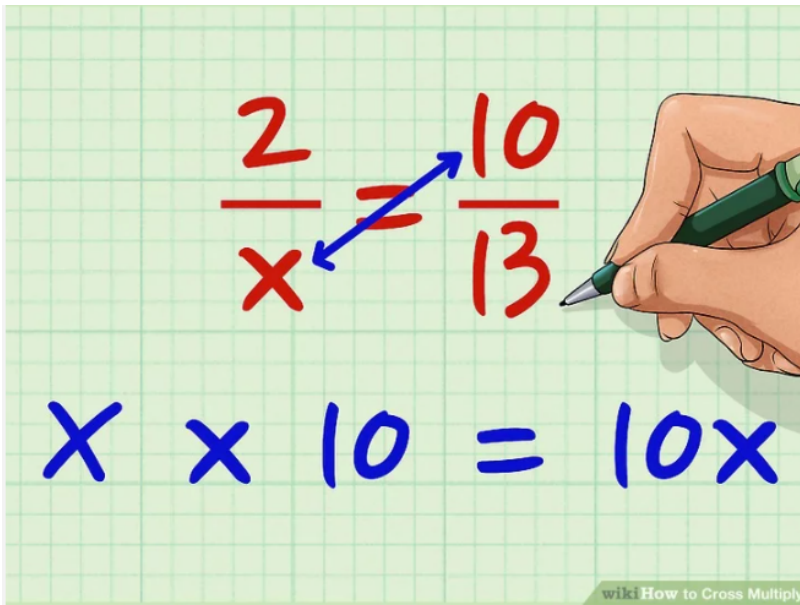
Cross multiply and divide:

Here's a nice explanation from https://www.wikihow.com/Cross-Multiply

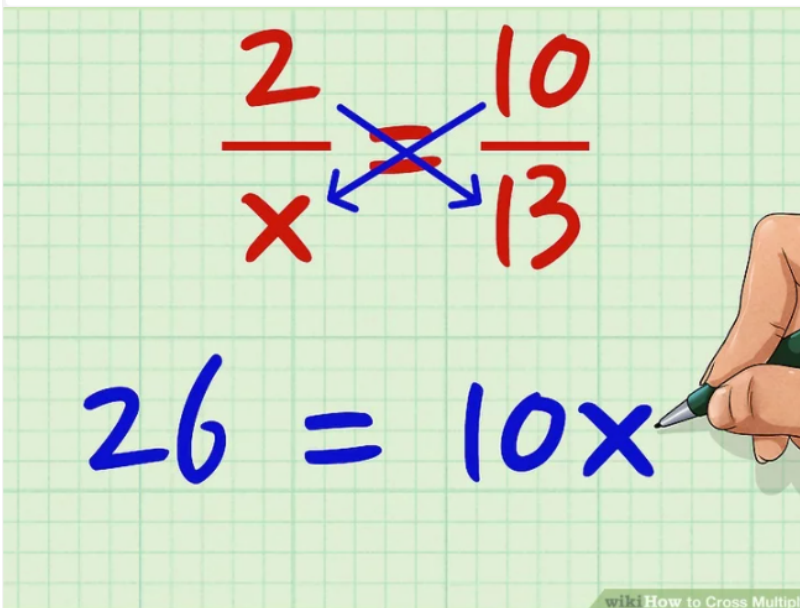**Method 1   Cross Multiplying with a Single Variable**

wiki **How to Cross Multiply**

1 Multiply the numerator of the left-hand fraction by the denominator of the right-hand fraction. Let's say you're working with the equation $2/x = 10/13$. Now, multiply 2 * 13. 2 * 13 = 26.[1]

2 **Multiply the numerator of the right-hand fraction by the denominator of the left-hand fraction.** Now multiply x by 10. x * 10 = 10x. You can cross multiply in this direction first; it really doesn't matter as long as you multiply both numerators by the denominators diagonal from them.[2]

3 **Set the two products equal to each other.** Just set 26 equal to 10x. 26 = 10x. It doesn't matter which number you list first; since they're equal, you can swap them from one side of the equation to the other with impunity, as long as you treat each term as a whole.[3]

- So, if you're trying to solve 2/x = 10/13 for x, you'd have 2 * 13 = x * 10, or 26 = 10x.
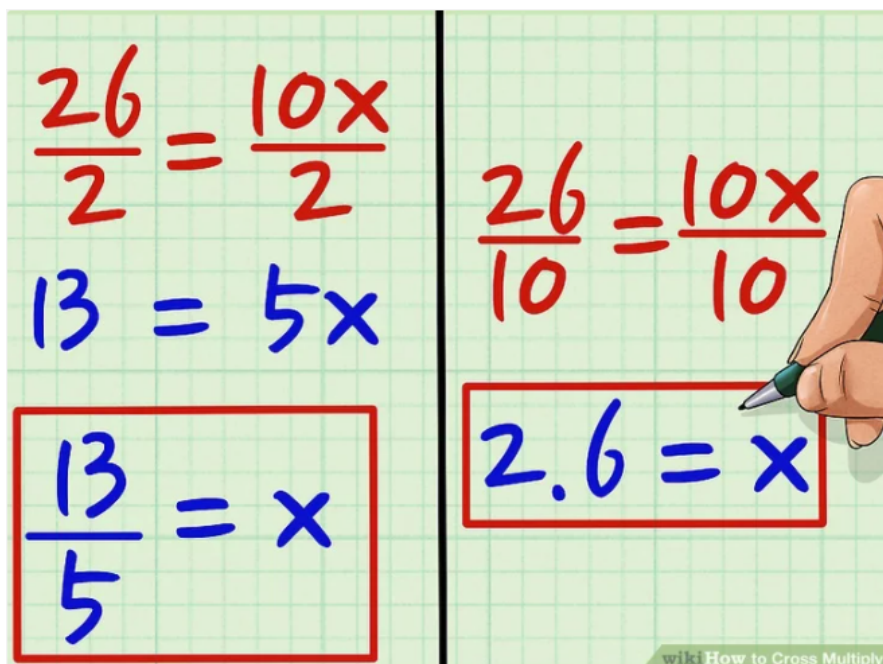
4 **Solve for the variable.** Now that you're working with 26 = 10x, you can start by finding a common denominator and dividing both 26 and 10 by a number that divides evenly into both numbers. Since they are both even, you can divide them by 2; 26/2 = 13 and 10/2 = 5. You're left with 13 = 5x. Now, to isolate x, divide both sides of the equation by 5. So, 13/5 = 5/5, or 13/5 = x. If you'd like the answer in decimal form, you can start by dividing both sides of the equation by 10 to get 26/10 = 10/10, or 2.6 = x.[4]

Here's a worked out example:

$\dfrac{7}{x} = \dfrac{10}{20}$	Given equation
$7 * 20 = 10x$	Cross multiply
$140 = 10x$	Finish multiplying. This step and the one above can be combined.
$\dfrac{140}{10} = \dfrac{10x}{10}$	Divide by whatever is multiplying x
$14 = x$	Here's your answer! You can always check by plugging it in to the original equations.

Extension: You can cross multiply to solve ugly looking equations with x in the denominator, too:

$$\frac{56}{x+2} = \frac{7}{2}$$

Cross-multiplying brings x up on top: $56 * 2 = 7\,(x+2)$ So now you have an equation you can solve, even if it's not simple.

Practice: Do as many problems on worksheet **2c.4 Practice** as you wish. I recommend doing the odd numbered problems only. As always, practice until you are confident you can do it but move on if it feels like busy work or is too easy. Answer key is on the last page, and I can provide worked-out answers. You can also send me a screenshot of a problem if you are stuck and I'll reply.