Dividing a Fraction by a Whole number Nov 2011

Steps

1. **Rewrite the problem, if necessary**. It may be written as a fraction-within-a-fraction, like (2/3)/4. If so, write it straight across, like this:

   $$\frac{2}{3} \div 4$$

2. **Change whole numbers into fractions with 1 in the denominator**. Yes, it will become an improper fraction, but that's okay. So for our problem, 4 becomes 4/1.

   $$\frac{2}{3} \div \frac{4}{1}$$

3. **Flip over the second fraction to create its reciprocal**. Replace 4/1 by its reciprocal, ¼

4. **At the same time, change the division sign into a multiplication sign.**

   $$\frac{2}{3} \times \frac{1}{4}$$

5. **Multiply the numerators with each other(2 × 1 = 2), then the denominators with each other (3 × 4 = 12)**.

   $$\frac{2 \times 1}{3 \times 4} = \frac{2}{12}$$

6. **Reduce your answer to lowest terms**. This means divide out any factors that the two numbers share. In our case, both the numerator and the denominator of 2/12 can be divided by 2. Therefore, the final answer is 1/6.

7.

$$\frac{2\times1}{3\times4}=\frac{2}{12}\Rightarrow\frac{1}{6}$$

Tips

- If you cross-cancel before you multiply, you probably won't need to reduce to lowest terms. In our example, before we multiply 2/3 × 1/4, we might notice that the first numerator (2) and the second denominator (4) have a common factor of 2, which we can cancel in advance. This changes the problem to 1/3 × 1/2, giving us 1/6 immediately and saving us the work of reducing the fraction at the end.

$$\frac{\cancel{2}^{1}}{3}\times\frac{1}{\cancel{4}_{2}}=\frac{1\times1}{3\times2}=\frac{1}{6}$$

- If any of your fractions is negative, this method still applies; just make sure you keep track of the sign as you go through the steps. Keep in mind that if a fraction is negative, the negative sign belongs ONLY to the NUMERATOR.

$$-\frac{6}{7}\div2\Rightarrow\frac{-6}{7}\div\frac{2}{1}\Rightarrow\frac{-6}{7}\times\frac{1}{2}\Rightarrow\frac{\cancel{-6}^{-3}}{7}\times\frac{1}{\cancel{2}_{1}}\Rightarrow\frac{-3\times1}{7\times1}\Rightarrow\frac{-3}{7}\Rightarrow-\frac{3}{7}$$

- An easy way to remember how to do all of this is to know the following: "Dividing fractions is easy as pie, flip the second number and multiply!"
- Another Variation of the above is KCF/KFC. Keep the first number. Change to multiplication. Flip the last number. Or F before C.

Warnings

- Only take the reciprocal of the **second** fraction, the one you're dividing *by*. Don't change the first one, the one you're dividing *into*. In our example, we converted the 4/1 to 1/4, but we left the 2/3 as 2/3 (we didn't change it to 3/2).

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