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Multiplication of Fractions

Multiplying Fractions with Fractions

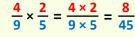
The meaning of multiplying a fraction by a fraction is to take that fractional part of the fraction. When a fraction is multiplied by a fraction, multiply the numerators and multiply the denominators. It is best to cancel before multiplying. Canceling is a way to simplify fractions before multiplying.

NOTE

The number properties of whole numbers (Associative, Commutative, and Distributive) are still applicable with fractions.

Example 1

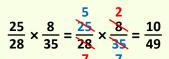
Find the product: $\frac{4}{9} \times \frac{2}{5} =$ Explanation

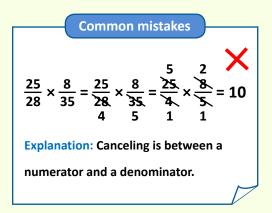


Example 2









Next we are going to introduce a few examples that are little more challenging.

Example 3 Apply the necessary property to solve: $\frac{3}{5} \times \frac{6}{13} + \frac{3}{5} \times \frac{7}{13} =$

Explanation

Use the distributive property:

 $\frac{3}{5} \times \frac{6}{13} + \frac{3}{5} \times \frac{7}{13} = \frac{3}{5} \times (\frac{6}{13} + \frac{7}{13}) = \frac{3}{5}$

Example 4

Apply the necessary property to solve: $\frac{16}{45} \times \frac{11}{18} - \frac{11}{45} \times \frac{7}{18} =$

Explanation

Switch the numerators in $\frac{16}{45} \times \frac{11}{18}$ or $\frac{11}{45} \times \frac{7}{18}$ so that the number property can be applied to simplify the calculation:

16 11 11 7		16 11 11 7	
$\frac{16}{45} \times \frac{11}{18} - \frac{11}{45} \times \frac{7}{18}$ $= \frac{11}{45} \times \frac{16}{18} - \frac{11}{45} \times \frac{7}{18}$ $= \frac{11}{45} \times (\frac{16}{18} - \frac{7}{18})$ $= \frac{11}{45} \times \frac{9}{18}$ $= \frac{11}{90}$	or	$\frac{16}{45} \times \frac{11}{18} - \frac{11}{45} \times \frac{7}{18}$ $= \frac{16}{45} \times \frac{11}{18} - \frac{7}{45} \times \frac{11}{18}$ $= \frac{11}{18} \times \left(\frac{16}{45} - \frac{7}{45}\right)$ $= \frac{11}{18} \times \frac{9}{45}$ $= \frac{11}{90}$	When a fraction is multiplied by a fraction, multiply the numerators and multiply the denominators. Therefore the product remains the same if we switch the positions of numerators.

Example 5

Apply the necessary strategy to solve: $\frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \dots + \frac{1}{99 \times 100} =$

Explanation

Every fraction can be transformed into the format of $\frac{1}{a \times (a+1)}$. And then $\frac{1}{a \times (a+1)} = \frac{1}{a} - \frac{1}{a+1}$. So $\frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \dots + \frac{1}{99 \times 100} = (\frac{1}{2} - \frac{1}{3}) + (\frac{1}{3} - \frac{1}{4}) + (\frac{1}{4} - \frac{1}{5}) + \dots + (\frac{1}{99} - \frac{1}{100})$

Remove the parentheses and use the associative property.

$$\left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \left(\frac{1}{4} - \frac{1}{5}\right) + \dots + \left(\frac{1}{99} - \frac{1}{100}\right)$$
$$= \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} + \frac{1}{4} - \frac{1}{5} + \dots + \frac{1}{99} - \frac{1}{100}$$
$$= \frac{1}{2} - \frac{1}{100}$$
$$= \frac{49}{100}$$