

Multiplying and Dividing Fractions

$$\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$$

Given two fractions, $\frac{a}{b}$ and $\frac{c}{d}$, we can multiply these fractions together by multiplying the two top numbers (numerators) together and placing them over the bottom numbers (denominators) multiplied together.

- note: we can change an integer (whole number) into a fraction by dividing by 1.

$$\text{Ex. } \frac{1}{2} \times \frac{3}{4} = \frac{3 (1 \times 3 = 3)}{8 (2 \times 4 = 8)}$$

$$\text{Ex. } 2 \times \frac{3}{4} = \frac{2}{1} \times \frac{3}{4} = \frac{6}{4}$$

Cross Cancellation: When multiplying two fractions together, if there is a common factor in the numerator of one and the denominator of the other, you can cancel the common factor.

$$\frac{\overset{1}{a} \cancel{d}}{b} \times \frac{c}{\underset{1}{d} \cancel{b}} = \frac{ac}{b}$$

$$\text{Ex. } \frac{\overset{1}{\cancel{2}} 3}{1 \cancel{4}} = \frac{3}{2}$$

Reciprocal of a fraction: the reciprocal of a fraction is a fraction with the numbers (numerator) reversed.

$$\frac{3}{4} \text{ 's reciprocal is } \frac{4}{3}.$$

Dividing Fractions:

In order to divide a number (or fraction) by another fraction, take the reciprocal of the second fraction and then multiply it by the original number (or fraction).

$$\text{Ex. } \frac{a}{b} \div \frac{c}{d} \Rightarrow \frac{a}{b} \times \frac{d}{c} \quad \left(\frac{d}{c} \text{ is the reciprocal of } \frac{c}{d} \right)$$

$$\text{Ex. } \frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \times \frac{2}{1} = \frac{6}{4}$$

$$\text{Ex. } 2 \div \frac{1}{2} = \frac{2}{1} \times \frac{2}{1} = \frac{4}{1} = 4$$

Exercises:

1.) $\frac{2}{4} \times \frac{3}{4} = ?$

2.) $\frac{2}{4} \times \frac{4}{3} = ?$

3.) $\frac{5}{3} \times \frac{9}{1} = ?$

4.) $-\frac{1}{2} \times \frac{3}{4} = ?$

5.) $\frac{2}{1} \times \frac{-3}{4} = ?$

6.) $\frac{5}{3} \div \frac{2}{3} = ?$

7.) $\frac{8}{2} \div \frac{4}{1} = ?$

8.) $\frac{5}{4} \div \frac{3}{2} = ?$

9.) $\frac{7}{4} \div \frac{5}{10} = ?$

10.) $\frac{3}{9} \div \frac{1}{3} = ?$