

Multiplying and dividing fractions

When we multiply fractions, we multiply their numerators to find the numerator of the result, and we multiply their denominators to find the denominator of the result.

$$\frac{3}{4} \times \frac{1}{7} \quad \frac{3 \times 1}{4 \times 7} \quad \frac{3}{28}$$

When we divide fractions, we actually turn the division problem into a multiplication problem by turning the divisor (the second fraction) upside down (switching its numerator with its denominator) and changing the division symbol to a multiplication symbol at the same time. We call this process “multiplying by the reciprocal.” The **reciprocal** of a fraction a/b is the fraction b/a (where the numerator and denominator are flipped).

$$\frac{3}{4} \div \frac{1}{7} \quad \frac{3}{4} \times \frac{7}{1} \quad \frac{3 \times 7}{4 \times 1} \quad \frac{21}{4}$$

It’s okay that in this last fraction, the numerator is larger than the denominator. When that’s the case, the fraction is called an “improper” fraction.

Example

Multiply the fractions.

$$\frac{2}{3} \times \frac{4}{11}$$



To multiply the fractions, we multiply the numerators and the denominators separately.

$$\frac{2 \times 4}{3 \times 11}$$

$$\frac{8}{33}$$

Let's do an example with division.

Example

Divide the fractions.

$$\frac{2}{3} \div \frac{4}{11}$$

To do division with fractions, we turn the second fraction upside down and change the division symbol to a multiplication symbol at the same time.

$$\frac{2}{3} \times \frac{11}{4}$$

Then we treat this as a multiplication problem, by multiplying the numerators and the denominators separately.

$$\frac{2 \times 11}{3 \times 4}$$



$$\frac{22}{12}$$

We always like to give our answer in lowest terms, so we'll simplify this fraction by canceling a 2 from the numerator and denominator.

$$\frac{22}{12} = \frac{2 \cdot 11}{2 \cdot 6}$$

$$\frac{\cancel{2} \cdot 11}{\cancel{2} \cdot 6}$$

$$\frac{11}{6}$$

Fractions and whole numbers

To multiply a fraction and a whole number, we have to convert the whole number into a fraction by rewriting it with a denominator of 1. For example, 5 can be written as $5/1$, and any number x can be rewritten as $x/1$.

Let's do an example where we rewrite the whole number as a fraction before multiplying the two numbers.

Example

Multiply the two numbers.

$$\frac{3}{4} \times 7$$



We have to start by rewriting 7 as $7/1$. Then we can multiply the fractions.

$$\frac{3}{4} \times \frac{7}{1}$$

$$\frac{3 \times 7}{4 \times 1}$$

$$\frac{21}{4}$$

