

M9

## 1.6 and 1.7 Multiplying and Dividing Fractions

Label the three parts of a fraction:

The diagram shows a horizontal line representing a fraction bar. Above the line is a rectangular box, and below the line is another rectangular box. A blue arrow starts at the top line on the right side and points down to the bottom line on the right side.

Q: What number is never allowed to be at the bottom of any fraction?

A: \_\_\_\_\_ is not allowed at the bottom of any fraction.

Q: How do you express a fraction as a decimal number?

A: To express a fraction as a decimal number one has to \_\_\_\_\_ the \_\_\_\_\_ of the fraction by its \_\_\_\_\_ .

Express the following fractions as decimal numbers:

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{2}{3}$	$\frac{3}{4}$

Q: What do we call a fraction that has 100 as its denominator?

For example:

$$\frac{13}{100}$$

A: **A fraction with a 100 in its denominator is called \_\_\_\_\_**

Q: What do we call a fraction that has 1 as its denominator?

For example:

$$\frac{15}{1}$$

A: **A number that can be expressed as a fraction with 1 in its denominator is called \_\_\_\_\_**

Q: Can a fraction have a negative number as its denominator?

Q: What do you do when comparing fractions?

For example:

Is  $\frac{14}{25}$  greater or smaller than  $\frac{12}{23}$ ?

Recall that we use symbols: \_\_\_\_\_ for “greater than” and \_\_\_\_\_ for “less than”

A:

Recall the appropriate mathematical terms for basic operations and their symbols:

Name of the operation	Symbol	Name of the result of the operation

### Reducing Fractions

To reduce a fraction is to express it in its lowest terms. That is, divide the numerator and the denominator by their largest common factor.

Example: Express given fractions in lowest terms:

$\frac{4}{6}$	$\frac{7}{28}$	$\frac{2}{13}$	$\frac{18}{32}$	$\frac{-9}{15}$

# Multiplying Fractions

To multiply fractions, follow these steps:

1. Reduce each fraction if possible.
2. Reduce fractions **diagonally** if possible.
3. Multiply all numerators.
4. Multiply all denominators.
5. Double check that the numerator and denominator do not have a common factor other than 1.

Example: Multiply. Remember to show your work and clearly identify the final answer.

1	$\frac{3}{7} \times \frac{2}{11}$	
2	$\frac{6}{7} \times \frac{5}{21}$	
3	$\frac{2}{8} \times \frac{3}{6}$	
4	$\frac{24}{6} \times \frac{5}{16}$	
5	$\frac{3}{7} \times \frac{2}{9} \times \frac{14}{5}$	
6	$\frac{10}{12} \times \frac{3}{5} \times \frac{11}{23}$	
7	$\frac{15}{6} \times \frac{10}{5} \times \frac{32}{8}$	
8	$\frac{14}{16} \times \frac{12}{11} \times \frac{21}{7}$	

# Dividing Fractions

- Dividing fractions is very similar to multiplying fractions. However, there is an important additional step.
- Division is the same as multiplication by a reciprocal. For example: Dividing by two is the same as multiplying by  $\frac{1}{2}$  and dividing by  $\frac{1}{3}$  is the same as multiplying by 3.

Recall: A reciprocal is a flipped fraction.

Write reciprocals for each number:

$-\frac{5}{6}$	$\frac{1}{7}$	$\frac{2}{3}$	$-\frac{9}{17}$	8

To divide fractions, follow these steps:

1. Reduce each fraction if possible.
2. KeepKissFlip = Copy the first fraction, change division to multiplication, reciprocate the second fraction.

3. Reduce fractions diagonally if possible.
  
4. Multiply all numerators.
  
5. Multiply all denominators.
  
6. Double check that the numerator and denominator do not have a common factor other than 1. Box/circle/underline the final answer.

Example: Divide. Remember to show your work and clearly identify the final answer.

1	$\frac{3}{7} \div \frac{2}{14}$	
2	$\frac{6}{7} \div \frac{15}{21}$	
3	$\frac{2}{8} \div \frac{12}{9}$	
4	$\frac{26}{33} \div \frac{5}{11}$	

5	$\frac{14}{20} \div \frac{7}{15} \div \frac{1}{6}$	
6	$\frac{10}{12} \div \frac{3}{5} \div \frac{10}{23}$	
7	$\frac{15}{6} \times \frac{10}{5} \div \frac{32}{8}$	
8	$\frac{14}{16} \div \frac{12}{21} \times \frac{8}{7}$	