

# Fractions

## Definition

A fraction is a part of a whole.

## Fraction Vocabulary

Whole number →  $5 \frac{3}{4}$  → Numerator  
→ Denominator

## Addition and Subtraction

The denominators must be the same to add or subtract.  
If the denominators are not the same you must MULTIPLY the denominator and numerators to find a common denominator.

Example  $3/5 + 2/3$  =  $3/5$  (multiply by top and bottom by 3 for denom. of 15) =  $9/15$   
=  $2/3$  (multiply top and bottom by 5 for denom. of 15) =  $10/15$

Now you can add the fractions, since they have a common denominator :  $9/15 + 10/15 = 19/15$

## Multiplication

Simply multiply the numerators and denominators

Example  $4/7 \times 2/3 = 8/21$

## Division

Flip the divisor (second) fraction, then multiply, as above

Example  $8/9 \div 5/6 = 8/9 \times 6/5 = 48/45$

## Improper Fractions

An improper fraction's numerator is larger than the denominator.

To convert an improper fraction to a mixed number

Divide the denominator into the numerator.

The answer is the whole number and the remainder is the numerator; the denominator stays the same.

$13/5 = 13 \div 5 = 2$  remainder  $3 = 2 \frac{3}{5}$

## Mixed Numbers

A mixed number consists of a whole number and a fraction.

To multiply or divide mixed numbers you must change them to improper fractions.

To convert a mixed number to an improper fraction

Multiply the denominator by the whole number and add the numerator; the denominator stays the same

$5 \frac{3}{4} = 5 \times 4 + 3 = 23/4$

## Simplification

To simplify a fraction divide the numerator and denominator by the greatest common factor. If the numbers seem too large, simply repeatedly divide by a more manageable number, like 2, 3, or 5.  
When fractions are being multiplied together you simplify diagonally.

Example  $\frac{8}{15} \times \frac{5}{12} = \frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$