

FRACTION BASICS

Definitions:

- **Fraction:** A way of showing the part of a whole. The "whole" could be one of something, like a pie or an hour, or it could be one group or set, such as a classroom of students or a store's customers.
- **Numerator:** The number of parts of interest.
- **Denominator:** The number of equal parts the whole contains.
- **Proper Fraction:** The numerator is smaller than the denominator.
- **Improper Fraction:** The numerator is as large or larger than the denominator. In algebra, an improper fraction is acceptable.
- **Mixed Number:** A number containing both a whole number and a fraction.
- **Equivalent Fractions:** Two fractions that represent the same quantity, but look different.
- **Reduce a Fraction:** Divide both numerator and denominator by the same number.
- **Lowest Terms:** A fraction which cannot be reduced further.

Numerator	→	$\frac{4}{5}$	←	Fraction Bar
Denominator	→			

Fundamental Principle of Fractions: If the numerator and denominator of a fraction are multiplied by the same number, then they are equivalent fractions. The same is true if you divide by the same number.

Fraction Facts:

- The fraction bar means division.
- Make a fraction out of a whole number by putting it over 1.
- Any number over itself equals one.
- A fraction with a zero *numerator* equals zero.
- A fraction with a zero *denominator* is meaningless.

Expand a Fraction

Multiply both the numerator and denominator by the same number.

Example: Expand $\frac{3}{5}$ to have a denominator of 15.

First, figure out what 5 needs to be multiplied by to get 15. ($15 \div 5 = 3$) Next multiply both numerator and denominator by that number. Do not reduce.

$$\frac{3}{5} \cdot \frac{3}{3} = \frac{9}{15}$$

Reduce a Fraction

Dividing both the numerator and denominator by the same number to put the fraction in lowest terms.

Example: Reduce $\frac{20}{45}$ to lowest terms.

Both numerator and denominator are divisible by 5.

$$\frac{20 \div 5}{45 \div 5} = \frac{4}{9}$$

Change a Mixed Number to an Improper Fraction

Multiply the denominator times the whole number, then add the numerator. This becomes the new numerator and the denominator stays the same.

Example: Change $3\frac{1}{4}$ to an improper fraction.

$$3\frac{1}{4} = \frac{4 \cdot 3 + 1}{4} = \frac{13}{4}$$

Change an Improper Fraction to a Mixed Number

Divide the denominator into the numerator. The answer (excluding any remainder) becomes the whole number. The remainder is the new numerator. The denominator remains the same.

Example: Change $\frac{29}{4}$ to a mixed number.

$$4 \overline{)29} \begin{array}{l} 7 \\ \underline{28} \\ 1 \end{array} \text{ with remainder } = 1.$$

$$\frac{29}{4} = 7\frac{1}{4}$$