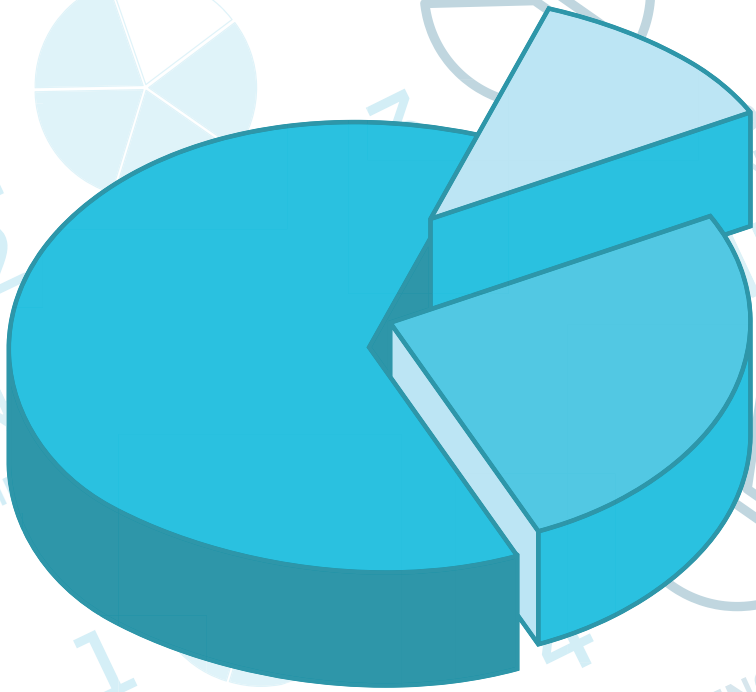
Topic Tutorials

POWERED BY Alpha II

Fractions

Fractions & Mixed Numbers



Student Copy: Fractions & Mixed Numbers Topic Tutorials

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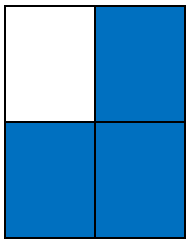
What are Fractions?

A **fraction** is part of a whole unit.

Numbers such as $\frac{1}{4}, \frac{1}{2}, \frac{2}{3}$ and $\frac{3}{4}$ are fractions.

Look at the square below. It is divided into 4 parts. Notice that the parts are the same size and 3 of the parts are colored blue.



You can write a fraction that shows how many parts of the square are colored blue. Write the *total* number of parts as the bottom number, or **denominator**, of the fraction: $\frac{\ }{4}$

Write the number of *colored* parts as the top number, or **numerator**, of the fraction: $\frac{3}{4}$.

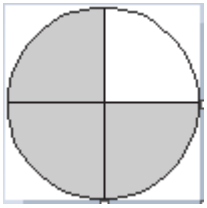
Every fraction has a numerator and a denominator.

The **denominator** is the bottom number. It tells how many equal sized parts there are in a *whole* unit.

The **numerator** is the top number. It tells how many parts of the unit are being colored or shaded.

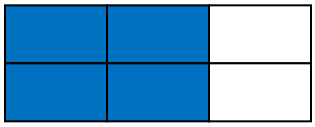
Procedure:

Write a fraction to tell what part of each object is shaded, or in color.

1) 

There are 3 pieces shaded out of 4 pieces.

The fraction is $\frac{3}{4}$.

2) 

There are 4 pieces colored out of 6 pieces.

The fraction is $\frac{4}{6}$.

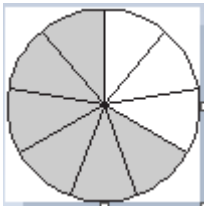
3) 

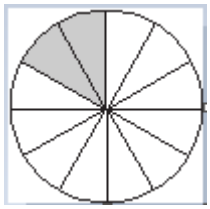
There are 6 pieces colored out of 7 pieces.

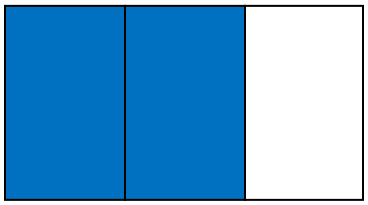
The fraction is $\frac{6}{7}$.

Try These:

Write a fraction to tell what part of each object is in color.

1) 

2) 

3) 

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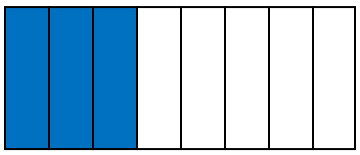
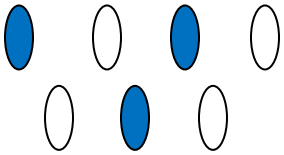
5) 

6) 

Finding Common Denominators

Like fractions have the *same* denominators.

Unlike fractions have *different* denominators.

You can change unlike fractions so that they have the same denominators.

The least common denominator (LCD) is the least possible whole number (excluding zero) that can be divided exactly by the denominators of all the given fractions.

Change $\frac{2}{3}$ and $\frac{5}{8}$ so that they have the least common denominator.

Step 1: Find the least common multiple (LCM) of the denominators.

Multiples of **3**: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

Multiples of **8**: 0, 8, 16, 24, 32, 40

The LCM of 3 and 8 is **24**.

Step 2: Use 24 as the new denominator.

$\frac{2}{3} = \frac{\quad}{24}$ and $\frac{5}{8} = \frac{\quad}{24}$

Step 3: Change $\frac{2}{3}$ to higher terms.

Divide the new denominator by the denominator of the given fraction.
24 ÷ 3 = 8

Multiply the numerator by the quotient.
2 x 8 = 16

The new fraction is $\frac{16}{24}$. $\frac{2x8}{3x8} = \frac{16}{24}$

Step 4: Repeat Step 3 with the second fraction ($\frac{5}{8}$)

Divide the new denominator by the denominator of the given fraction.
24 ÷ 8 = 3

Multiply the numerator by the quotient.
5 x 3 = 15

The new fraction is $\frac{15}{24}$. $\frac{5x3}{8x3} = \frac{15}{24}$

Procedure:

1) Find the least common denominator (LCD) of the given fractions.

   $\frac{1}{3}$ and $\frac{5}{6}$

   Multiples of 3: 0, 3, 6, 9, 12, 15, 18, 21,…

   Multiples of 6: 0, 6, 12, 18, 24, 30, 36,…

The LCM is 6, so the LCD is also 6.

2) Express the fractions as equivalent fractions using the LCD as the new denominator.

$\frac{1}{3} = \frac{?}{6}$ $\qquad$ $\frac{1x2}{3x2} = \frac{2}{6}$

$\frac{5}{6} = \frac{?}{6}$ $\qquad$ $\frac{5x1}{6x1} = \frac{5}{6}$

Answer: LCD = 6; $\frac{1}{3} = \frac{2}{6}$ and $\frac{5}{6} = \frac{5}{6}$

Find the least common denominator (LCD) of the given fractions. Then express the given fractions as equivalent fractions having the LCD as their new denominator.

3) $\frac{2}{3}$ and $\frac{3}{4}$

Multiples of 3: 0, 3, 6, 9, 12, 15, …

Multiples of 4: 0, 4, 8, 12, 16, 20, …

LCM is 12, so the LCD is 12.

Rewrite equivalent fractions using the LCM as the new denominator.

$\frac{2}{3} = \frac{?}{12}$ $\qquad$ $\frac{3}{4} = \frac{?}{12}$

$\frac{2}{3} = \frac{2x4}{3x4} = \frac{8}{12}$ $\qquad$ $\frac{3}{4} = \frac{3x3}{4x3} = \frac{9}{12}$ $\qquad$ Answer: $\frac{8}{12}$ and $\frac{9}{12}$

4) $\frac{3}{9}$ and $\frac{3}{4}$

Multiples of 9: 0, 9, 18, 27, 36, 45, 54, …

Multiples of 4: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, …

LCM is 36, so the LCD is 36.

Rewrite equivalent fractions using the LCM as the new denominator.

$\frac{3}{9} = \frac{?}{36}$ $\qquad$ $\frac{3}{4} = \frac{?}{36}$

$\frac{3}{9} = \frac{3x4}{9x4} = \frac{12}{36}$ $\qquad$ $\frac{3}{4} = \frac{3x9}{4x9} = \frac{27}{36}$ $\qquad$ Answer: $\frac{12}{36}$ and $\frac{27}{36}$

5) $\frac{2}{3}$, $\frac{7}{8}$ and $\frac{1}{6}$

Multiples of 3: 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30,…

Multiples of 8: 0, 8, 16, 24, 32, 40, 48, …

Multiples of 6: 0, 6, 12, 18, 24, 30, 36, 42, …

LCM is 24, so the LCD is 24.

Rewrite equivalent fractions using the LCM as the new denominator.

$\frac{2}{3} = \frac{?}{24}$ $\qquad$ $\frac{7}{8} = \frac{?}{24}$ $\qquad$ $\frac{1}{6} = \frac{?}{24}$

$\frac{2}{3} = \frac{2x8}{3x8} = \frac{16}{24}$ $\qquad$ $\frac{7}{8} = \frac{7x3}{8x3} = \frac{21}{24}$ $\qquad$ $\frac{1}{6} = \frac{1x4}{6x4} = \frac{4}{24}$

Answer: $\frac{16}{24}$, $\frac{21}{24}$ and $\frac{4}{24}$.

Try These:

Find the least common denominator (LCD) of the given fractions. Then express the given fractions as equivalent fractions having the LCD as their new denominator.

1) $\frac{1}{2}$ and $\frac{13}{16}$

2) $\frac{2}{3}$ and $\frac{5}{8}$

3) $\frac{7}{10}$ and $\frac{5}{12}$

4) $\frac{3}{4}$, $\frac{1}{2}$ and $\frac{7}{8}$

5) $\frac{2}{5}$, $\frac{5}{6}$ and $\frac{1}{3}$

6) Which group of fractions is 24 the LCD?

a) $\frac{3}{4}$ and $\frac{5}{6}$ b) $\frac{5}{8}$ and $\frac{2}{3}$ c) $\frac{1}{2}$, $\frac{11}{12}$ and $\frac{1}{3}$

7) Which group of fractions is 18 the LCD?

a) $\frac{1}{6}$ and $\frac{2}{3}$ b) $\frac{7}{9}$ and $\frac{1}{2}$ c) $\frac{7}{12}$, $\frac{5}{6}$ and $\frac{2}{9}$

8) Which group of fractions is 12 the LCD?

a) $\frac{5}{9}$ and $\frac{3}{4}$ b) $\frac{1}{2}$ and $\frac{5}{6}$ c) $\frac{2}{3}$, $\frac{3}{4}$ and $\frac{1}{6}$

9) Which group of fractions is 32 the LCD?

a) $\frac{11}{16}$ and $\frac{7}{8}$ b) $\frac{3}{4}$ and $\frac{15}{32}$ c) $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$

10) Which group of fractions is 48 the LCD?

a) $\frac{5}{6}$ and $\frac{3}{8}$ b) $\frac{7}{12}$ and $\frac{3}{4}$ c) $\frac{11}{16}$, $\frac{1}{6}$ and $\frac{5}{8}$

Changing Improper Fractions to Mixed Numbers

Improper fractions can be changed to mixed numbers.

Example: Change $\frac{34}{8}$ to a mixed number. Follow the steps below.

Step 1: Divide the numerator by the denominator.

34 ÷ 8 = 4 R 2

Step 2: Write the quotient as the whole number in the mixed number.

Express the remainder as a fraction. The mixed number is $4\frac{2}{8}$.

Step 3: If the fraction can be simplified, simplify it.

$$4\frac{2}{8} = 4\frac{2\div 2}{8\div 2} = 4\frac{1}{4}$$

Answer: $4\frac{1}{4}$

Some improper fractions can be changed to whole numbers.

Example: Change $\frac{32}{8}$ to a whole number. Follow the steps below.

Step 1: Divide the numerator by the denominator.

32 ÷ 8 = 4

Step 2: Write the quotient as the whole number in the mixed number.

Answer: 4

Procedure:

1) Write $\frac{9}{4}$ as a mixed number in lowest terms.

Divide the numerator by the denominator. 9 ÷ 4 = 2 R 1

Write the quotient as the whole number and express the remainder as the fraction. $2\frac{1}{4}$.

This fraction cannot be simplified. Answer: $2\frac{1}{4}$

2) Write $\frac{56}{6}$ as a mixed number in lowest terms.

Divide the numerator by the denominator. 56 ÷ 6 = 9 R 2

Write the quotient as the whole number and express the remainder as the fraction. $9\frac{2}{6}$.

This fraction can be simplified. $9\frac{2}{6} = 9\frac{2\div 2}{6\div 2} = 9\frac{1}{3}$ Answer: $9\frac{1}{3}$

3) Write $\frac{35}{5}$ as a mixed number in lowest terms.

Divide the numerator by the denominator. 35 ÷ 5 = 7

Write the quotient as the whole number. Since there is no remainder, there is no fractional part to write.

Answer: 7

Try These:

Change the improper fractions to mixed numbers in lowest terms.

1) $\frac{17}{9}$

2) $\frac{8}{5}$

3) $\frac{10}{3}$

4) $\frac{16}{8}$

5) $\frac{18}{3}$

6) $\frac{22}{7}$

7) $\frac{54}{8}$

8) $\frac{29}{3}$

9) $\frac{42}{6}$

10) $\frac{80}{9}$