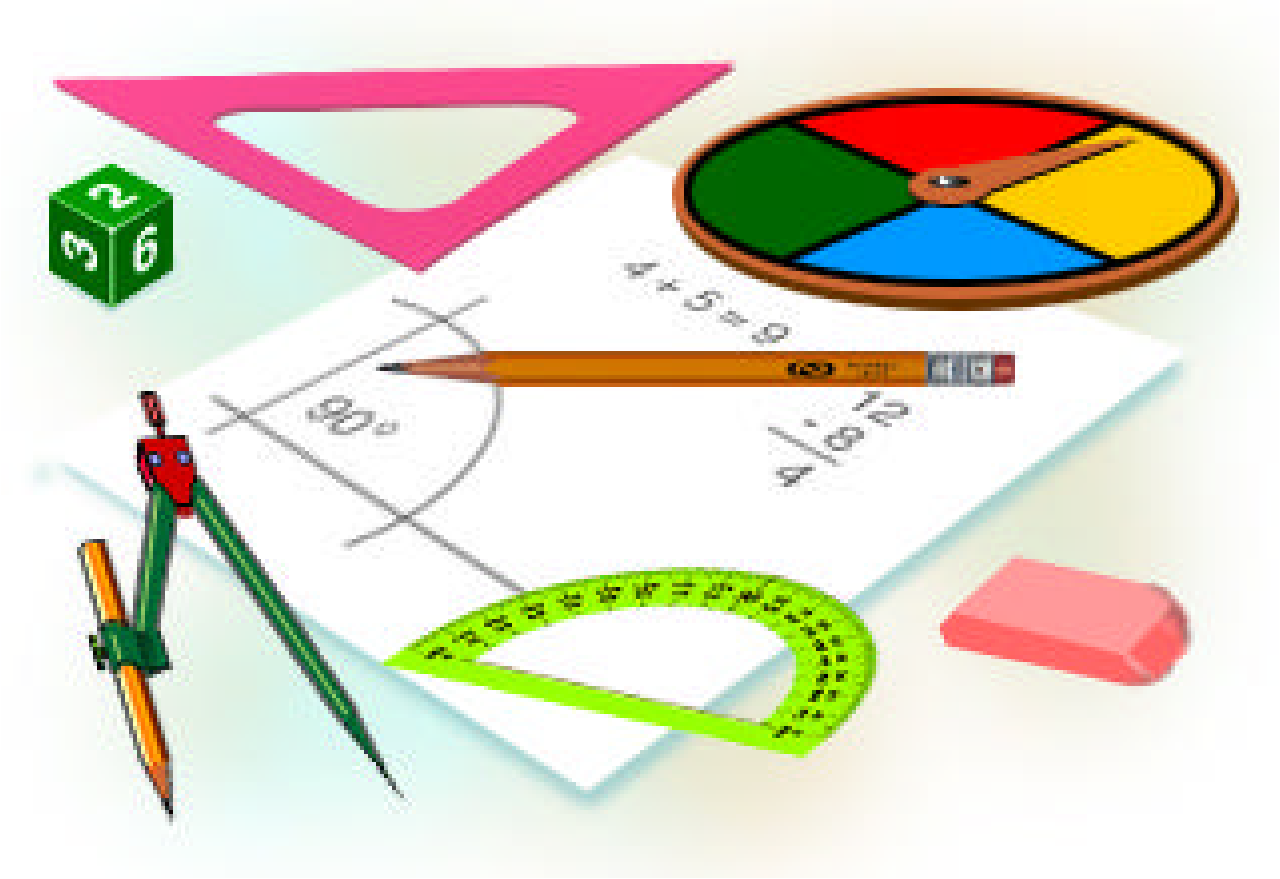
The Next Step

Mathematics Applications for Adults



Book 14014 – Fractions

OUTLINE

Mathematics - Book 14014

Fractions
Understanding and Comparing Fractions
demonstrate the ability to visualize fractions.
compare fractions, using < and >.

THE NEXT STEP

Book 14014

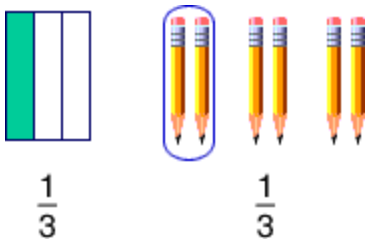
Fractions

Understanding and Comparing Fractions

Peanuts by *Charles Shultz* 4/12 Copyright 1986 byUnited Feature Syndicate Inc.

The word ***fraction*** means "part of a whole." The word comes from the Latin word ***fractio***, meaning "to break into pieces." In math, a fraction means one or more parts of a whole.

Example:

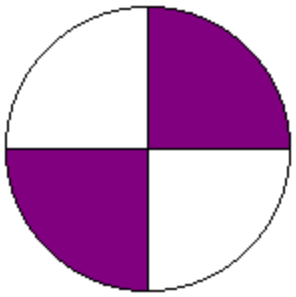


A fraction has two parts, a ***denominator*** and a ***numerator***. The denominator is the numeral written under the bar and tells the number of parts a whole is divided into. The numerator is the numeral written above the bar. The numerator tells the number of parts of the whole that are being counted.

numerator	number of parts counted	1
denominator	total parts of the whole	17

Practice Exercise

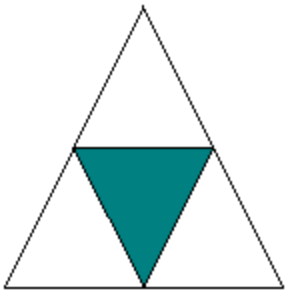
Write the fraction of the coloured part.

1. 

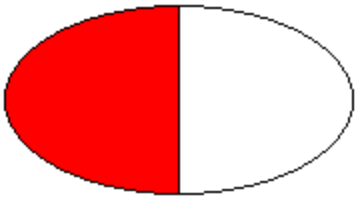
_____ of the circle is coloured.

2. 

_____ of the rectangle is coloured.

3. 

_____ of the triangle is coloured.

4. 

_____ of the ellipse is coloured.

Fill in the blanks.

1. $\frac{1}{3}$ and _____ make 1 whole.
2. $\frac{2}{5}$ and _____ make 1 whole.
3. $\frac{4}{9}$ and _____ make 1 whole.

Equivalent Fractions

You know from experience that different fractions can have the same value.

> Since there are 100 pennies in a dollar, 25 pennies is equal to 25/100 of a dollar. The same amount also equals a quarter, or ¼ of a dollar.
> On a measuring cup, ½ cup is the same amount as 2/4 cup.
> On an odometer, 5/10 of a mile is the same as ½ mile.
> Out of a dozen doughnuts, six doughnuts equal 6/12, or ½ dozen.

A napkin is folded into two parts. One part is yellow, the other red.

½ yellow

½ red

Then the napkin is folded again. Now there are two yellow parts and two red parts.

$\frac{2}{4}$ yellow

$\frac{2}{4}$ red

In this example, the red part of the napkin can be described as ½ red or 2/4 red. That makes ½ and 2/4 ***equivalent fractions***.

When solving math problems, reduce fractions to their lowest equivalent. Rather than describing the napkin as 2/4 yellow, call it ½ yellow.

Some Equivalent Fractions

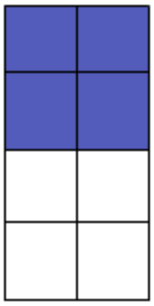
$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$$

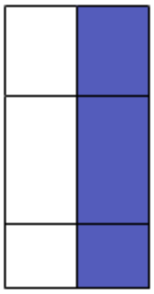
$$\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20}$$

$$\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12} = \frac{5}{15}$$

You can tell if two fractions are equal by finding cross products.

Example Are 4/8 and 3/6 equal fractions?





Multiply diagonally as shown by the arrows below. If the cross products are equal, the fractions are equal.

$\frac{4}{8} \quad \frac{3}{6}$ **4 x 6 = 24**
8 x 3 = 24

Since the cross products are equal, **4/8 = 3/6.**

Sometimes you need to find an equal fraction with higher terms. You raise a fraction to higher terms by multiplying both the numerator and the denominator by the same number (except 0).

5/8 and 20/32 are equal fractions because $\frac{5 \times 4}{8 \times 4} = \frac{20}{32}$

Often you will need to find an equal fraction with a specific denominator. To do this, think, "What number multiplied by the original denominator will result in the new denominator?" Then multiply the original numerator by the same number.

Example ¾ = ?/24

Since 4 x 6 = 24, multiply the numerator 3 by 6. $\frac{3 \times 6}{4 \times 6} = \frac{18}{24}$

The fractions ¾ **and 18/24 are equal fractions.**

Comparing Fractions

When two fractions have the same number as the denominator, they are said to have a common denominator, and the fractions are called like fractions. When you compare like fractions, the fraction with the greater numerator is the greater fraction.

Example 1 Which fraction is greater, 3/5 or 4/5?

The fractions 3/5 and 4/5 are like fractions because they have a common denominator, 5. Compare the numerators.

Since 4 is greater than 3, **4/5 is greater than 3/5.**

Fractions with different denominators are called unlike fractions. To compare unlike fractions, you must change them to fractions with a common denominator.

The common denominator will always be a multiple of both of the original denominators. The multiples of a number are found by going through the times tables for the number. For instance, the multiples of 3 are 3, 6, 9, 12, 15, 18, and so on.

You can often find a common denominator by using mental math. If not, try these methods:

1. See whether the larger denominator could be a common denominator. In other words, if the smaller denominator can divide into the larger denominator evenly, use the larger denominator as the common denominator.

2. Go through the multiples of the larger denominator. The first one that can be divided evenly by the smaller denominator is the lowest common denominator.

Example 2 Which is greater, 5/6 or ¾?

Go through the multiples of the larger denominator: 6, 12, 18, 24, 30…. Since 12 can be divided evenly by both 4 and 6, 12 is the lowest common denominator.

Build equal fractions, each with the denominator 12:

$\frac{5 \times 2}{6 \times 2} = \frac{10}{12}$ $\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$

Compare the like fractions. Since 10/12 > 9/12, the fraction **5/6 > ¾.**

Practice Exercise

Fill in the missing numerator or denominator.

1.	$\frac{1}{10}$	=	$\frac{2}{\quad}$	2.	$\frac{1}{2}$	=	$\frac{\quad}{8}$
3.	$\frac{2}{12}$	=	$\frac{10}{\quad}$	4.	$\frac{3}{4}$	=	$\frac{\quad}{12}$
5.	$\frac{2}{3}$	=	$\frac{24}{\quad}$	6.	$\frac{4}{6}$	=	$\frac{\quad}{12}$
7.	$\frac{2}{7}$	=	$\frac{\quad}{63}$	8.	$\frac{7}{11}$	=	$\frac{77}{\quad}$
9.	$\frac{4}{8}$	=	$\frac{16}{\quad}$	10.	$\frac{9}{12}$	=	$\frac{\quad}{48}$
11.	$\frac{8}{10}$	=	$\frac{\quad}{20}$	12.	$\frac{1}{3}$	=	$\frac{4}{\quad}$
13.	$\frac{3}{6}$	=	$\frac{\quad}{66}$	14.	$\frac{3}{11}$	=	$\frac{\quad}{22}$
15.	$\frac{1}{7}$	=	$\frac{8}{\quad}$	16.	$\frac{2}{5}$	=	$\frac{8}{\quad}$
17.	$\frac{6}{9}$	=	$\frac{54}{\quad}$	18.	$\frac{3}{8}$	=	$\frac{\quad}{72}$

Fraction Comparison

1.	$\frac{7}{15}$	<	$\frac{10}{15}$	2.	$\frac{7}{16}$	—	$\frac{1}{16}$
3.	$\frac{8}{9}$	—	$\frac{3}{9}$	4.	$\frac{3}{11}$	—	$\frac{6}{11}$
5.	$\frac{3}{7}$	—	$\frac{6}{7}$	6.	$\frac{6}{9}$	—	$\frac{5}{9}$
7.	$\frac{9}{15}$	—	$\frac{7}{15}$	8.	$\frac{5}{17}$	—	$\frac{16}{17}$
9.	$\frac{4}{8}$	—	$\frac{3}{8}$	10.	$\frac{1}{11}$	—	$\frac{9}{11}$
11.	$\frac{9}{10}$	—	$\frac{1}{10}$	12.	$\frac{1}{5}$	—	$\frac{2}{5}$
13.	$\frac{1}{2}$	—	$\frac{1}{2}$	14.	$\frac{1}{12}$	—	$\frac{10}{12}$
15.	$\frac{3}{4}$	—	$\frac{2}{4}$	16.	$\frac{1}{6}$	—	$\frac{2}{6}$
17.	$\frac{2}{17}$	—	$\frac{7}{17}$	18.	$\frac{2}{3}$	—	$\frac{1}{3}$

Answer Key

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Page 4 **1.** 2/4 **or** ½ **2.** 1/3 **3.** ¼ **4.** ½

Page 5 **1.** 2/3 **2.** 3/5 **3.** 5/9

Page 10 **1.** 20 **2.** 4 **3.** 60 **4.** 33 **5.** 36 **6.** 8
7. 18 **8.** 121 **9.** 32 **10.** 36 **11.** 16
12. 12 **13.** 33 **14.** 6 **15.** 56 **16.** 20
17. 81 **18.** 27

Page 11 **2.** > **3.** > **4.** < **5.** < **6.** > **7.** >
8. < **9.** > **10.** < **11.** > **12.** < **13.** =
14. < **15.** > **16.** < **17.** < **18.** >