Working with fractions

CHARLES STURT UNIVERSITY

Learning Skills

Introduction:

Most of the medication formulae are in a fraction format so it is important to become comfortable with working with fractions.

This sheet will teach you to:

- Become familiar with different types of fractions
- Simplify fractions
- Multiply fractions

1. What is a fraction?

A fraction is a ratio between two values. It is written in the format of one value over the other. The top number in a fraction is called the *numerator* and the bottom the *denominator*: $\frac{\text{numerator}}{\text{denominator}}$

You will be working with two types of fractions:

- a proper fraction has a smaller numerator than the denominator so represents a portion less than one whole: for instance $\frac{7}{12}$
- an improper fraction has a bigger numerator than denominator: for instance $\frac{25}{4}$

Any number becomes a fraction by putting it over 1: 6 becomes $\frac{6}{1}$

2. Simplifying fractions

Simplifying a fraction can make the numbers easier to work with.

To simplify a fraction divide the numerator and denominator by a common factor

Common factor

A common factor is a number that divides evenly into two numbers

Examples: simplify these fractions

a. $\frac{15}{20}$

5 divides evenly into 15 and 20: $\frac{15^{\div 5}}{20_{\div 5}} = \frac{3}{4}$

b. $\frac{125}{75}$

25 divides evenly into 125 and 75: $\frac{125^{\div 25}}{75_{\div 25}} = \frac{5}{3}$

> **Note**
>
> Proper and improper fractions are simplified the same way

c. $\frac{300}{5000}$

100 divides evenly into 300 and 5000 – cross off 2 noughts top and bottom

$\frac{3\cancel{00}}{50\cancel{00}} = \frac{3}{50}$

d. $\frac{72}{88}$

Sometimes the fraction can be broken down several times

$\frac{72^{\div 2}}{88_{\div 2}} = \frac{36^{\div 2}}{44_{\div 2}} = \frac{18^{\div 2}}{22_{\div 2}} = \frac{9}{11}$

3. Some hints on factors

All even numbers (numbers ending in 0, 2, 4, 6 or 8) are divisible by 2

All numbers ending in 0 or 5 are divisible by 5

All numbers ending in 0 are divisible by 10

All numbers ending in 00 or 25 or 50 or 75 are divisible by 25

Numbers are divisible by 3 if the sum of their digits is divisible by 3, for example 42 is divisible by 3 because 4+2 = 6 and 6 is divisible by 3

so a fraction such as $\frac{42}{27}$ can be simplified by dividing by the common factor 3:

$\frac{42^{\div 3}}{27_{\div 3}} = \frac{14}{9}$ where $3\overline{)4\ {}^{1}2}\ \ 1\ \ 4$

4. Multiplying fractions

Rule: to multiply fractions, multiply the numerators and multiply the denominators, then simplify the answer if possible.

Examples: Multiply these fractions
Answers should either be as proper or improper fractions expressed in simplest form

a) $\frac{2}{7}\times\frac{1}{3}$

$$\frac{2}{7}\times\frac{1}{3}=\frac{2\times1}{7\times3}=\frac{2}{21}$$

b) $\frac{2}{5}\times\frac{3}{8}$

$$\frac{2}{5}\times\frac{3}{8}=\frac{2\times3}{5\times8}=\frac{6}{40} \quad \text{simplify } \frac{\div2}{\div2}=\frac{3}{20}$$

or an alternative method here is to cancel or simplify before multiplying out.

$$\frac{\cancel{2}^{1}\times3}{5\times\cancel{8}_{4}}=\frac{3}{20}$$

c) $4\times\frac{5}{7}$

Make the 4 into a fraction by writing as $\frac{4}{1}$

$$\frac{4}{1}\times\frac{5}{7}=\frac{4\times5}{1\times7}=\frac{20}{7}$$

5. Some exercises to try

Exercise set 1
Simplify these fractions

1) $\frac{4}{14}$

2) $\frac{25}{40}$

3) $\frac{12}{15}$

4) $\frac{18}{12}$

5) $\frac{68}{36}$

6) $\frac{12}{28}$

7) $\frac{42}{48}$

8) $\frac{9}{30}$

9) $\frac{52}{64}$

10) $\frac{75}{300}$

Exercises set 2
Multiply these fractions - answers as proper or improper fractions in simplest form.

1) $\frac{1}{5}\times\frac{4}{7}$

2) $\frac{4}{9}\times\frac{2}{3}$

3) $\frac{1}{4}\times\frac{1}{2}$

4) $\frac{2}{5}\times\frac{3}{10}$

5) $\frac{3}{12}\times\frac{4}{5}$

6) $\frac{6}{7}\times\frac{3}{10}$

7) $\frac{5}{12}\times 16$

8) $\frac{6}{15}\times\frac{7}{8}$

9) $\frac{27}{100}\times\frac{5}{6}$

10) $\frac{2}{5}\times 100$

11) $\frac{1000}{7}\times\frac{15}{60}$

12) $\frac{200}{500}\times\frac{2}{5}$

6. Solutions

Set 1

1) $\frac{2}{7}(cf=2)$

2) $\frac{5}{8}(cf=5)$

3) $\frac{4}{5}(cf=3)$

4) $\frac{3}{2}(cf=6)$

5) $=\frac{34}{18} \quad =\frac{17}{9}$

6) $\frac{6}{14} \quad =\frac{3}{7}$

7) $\frac{21}{24}(cf=2) \quad =\frac{7}{8}(cf=3)$

8) $\frac{3}{10}(cf=3)$

9) $\frac{26}{32} \quad =\frac{13}{16}$

10) $\frac{3}{12}(cf=25) \quad =\frac{1}{4}(cf=3)$

Set 2

1) $\frac{1\times 4}{5\times 7}=\frac{4}{35}$

2) $\frac{4\times 2}{9\times 3}=\frac{8}{27}$

3) $\frac{1\times 1}{4\times 2}=\frac{1}{8}$

4) $\frac{2\times 3}{5\times 10}=\frac{6}{50} \quad =\frac{3}{25}$

5) $\frac{3\times 4}{12\times 5}=\frac{12}{60} \quad =\frac{6}{30} \quad =\frac{3}{15} \quad =\frac{1}{5}$

6) $\frac{6\times 3}{7\times 10}=\frac{18}{70}=\frac{9}{35}$

7) $\frac{5\times 16}{12\times 1}=\frac{80}{12}=\frac{40}{6}=\frac{20}{3}$

8) $\frac{6\times 7}{15\times 8}=\frac{42}{120}=\frac{21}{60} \quad (cf=3) \quad =\frac{7}{20}$

9) $\frac{27\times 5}{100\times 6}=\frac{135}{600} \quad =\frac{27}{120} \quad (cf=5) \quad =\frac{9}{40}(cf=3)$

10) $\frac{2\times 100}{5\times 1}=\frac{200}{5} \quad =\frac{40}{1}=40$

11) $\frac{1000\times 15}{7\times 60}=\frac{15000}{420}=\frac{1500}{42}=\frac{750}{21} \quad =\frac{250}{7}(cf=5)$

12) $\frac{200\times 2}{500\times 5}=\frac{400}{2500}=\frac{4}{25}$

7. For more information

Visit our Learning Skills website at http://www.csu.edu.au/division/studserv/maths/index.htm