7 Ratio and Proportion

7.1 Equivalent Ratios

Orange squash is to be mixed with water in a ratio of 1 : 6; this means that for every unit of orange squash, 6 units of water will be used. The table gives some examples:

Amount of Orange Squash (cm^3)	Amount of Water (cm^3)
1	6
20	120
5	30

The ratios 1 : 6 and 20 : 120 and 5 : 30 are all equivalent ratios, but 1 : 6 is the *simplest* form.

Ratios can be simplified by dividing both sides by the same number: note the similarity to fractions. An alternative method for some purposes, is to reduce to the form 1 : *n* or *n* : 1 by dividing *both* numbers by either the left-hand-side (LHS) or the right-hand-side (RHS). For example:

the ratio 4 : 10 may be simplified to $\frac{4}{4} : \frac{10}{4}$ $\Rightarrow 1 : 2.5$

the ratio 8 : 5 may be simplified to $\frac{8}{5} : \frac{5}{5}$ $\Rightarrow 1.6 : 1$

Example 1

Write each of these ratios in its simplest form:

(a) 7 : 14 (b) 15 : 25 (c) 10 : 4

Solution

(a) Divide both sides by 7, giving

$7 : 14 = \frac{7}{7} : \frac{14}{7}$

$= 1 : 2$

(b) Divide both sides by 5, giving

$15 : 25 = \frac{15}{5} : \frac{25}{5}$

$= 3 : 5$

(c) Divide both sides by 2, giving

$10 : 4 = \frac{10}{2} : \frac{4}{2}$

$= 5 : 2$