

# 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:

<i>Amount of Orange Squash</i> (cm <sup>3</sup> )	<i>Amount of Water</i> (cm <sup>3</sup> )
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:

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

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



### 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

$$\begin{aligned} 7 : 14 &= \frac{7}{7} : \frac{14}{7} \\ &= 1 : 2 \end{aligned}$$

(b) Divide both sides by 5, giving

$$\begin{aligned} 15 : 25 &= \frac{15}{5} : \frac{25}{5} \\ &= 3 : 5 \end{aligned}$$

(c) Divide both sides by 2, giving

$$\begin{aligned} 10 : 4 &= \frac{10}{2} : \frac{4}{2} \\ &= 5 : 2 \end{aligned}$$