Manipulating Ratios

Simplifying Ratios Exercise 25A

1f) $36 : 6 = 6 : 1$

2f) $150\text{mm} : 40\text{cm} = 150\text{mm} : 400\text{mm} = 15 : 40 = 3 : 8$

3f) $2.4 \text{ tonnes} : 132\text{kg} = 2400\text{kg} : 132\text{kg}$

$= 600 : 33$

$= 200 : 11$

4f) $\frac{1}{3} : \frac{3}{4} = \frac{12}{3} : \frac{36}{4} = 4 : 9$

5f) $0.08 : 0.2 : 1 = 8 : 20 : 100 = 2 : 5 : 25$

Classwork - complete Exercise 25A

Unitary Ratios

These are ratios in the form

$n : 1$ or $1 : n$

Exercise 25B

1h) $25\text{g} : 1\text{kg} = 25 : 1000 = 1 : 40$ $(1 : n)$

2h) $5\text{p} : 25\text{p} = \frac{5}{25} : 1 = 0.2 : 1$ $(n : 1)$

Exercise 25C

1h) $7 : x = 35 : 40$ $x = \frac{40}{5} = 8$

Ratio Exercises

Exercise 25A

Write these ratios in their simplest form.

1 (a) 20 : 16 (b) 3 : 15 (c) 12 : 48
(d) 8 : 4 (e) 18 : 12 (f) 36 : 6
(g) 24 : 72 : 12 (h) 3 : 6 : 9

2 (a) 2 cm : 1 m (b) 350 mg : 1 g (c) 10 ml : 2l
(d) 64 g : 4 kg (e) £3 : 40p : £1.20 (f) 150 mm : 40 cm

3 (a) 340 m : 1.2 km (b) 40 mins : 2h : $\frac{1}{2}$h (c) 45 g : 1 kg
(d) 42p : £1.05 (e) 45 cm : 0.1 m (f) 2.4 tonnes : 132 kg

4 (a) $2 : \frac{1}{3}$ (b) $4 : \frac{1}{4}$ (c) $\frac{1}{2} : \frac{1}{4}$
(d) $\frac{1}{2} : \frac{1}{3}$ (e) $\frac{3}{4} : \frac{1}{4} : \frac{1}{2}$ (f) $\frac{1}{3} : \frac{3}{4}$
(g) $\frac{3}{4} : 1 : 2\frac{1}{2}$ (h) $\frac{5}{9} : \frac{4}{5}$

5 (a) 1.2 : 3.4 (b) 5.5 : 1.15 (c) 3 : 1.4
(d) 5.9 : 0.04 (e) 4 : 3.5 : 5.5 (f) 0.08 : 0.2 : 1

Exercise 25B

Write these ratios in the form $1 : n$.

1 (a) 2 : 5 (b) 32 g : 8 g (c) 10 cm : 10 m (d) 4 : 10
(e) 32p : £2 (f) 2 : 15 (g) 5 : 11 (h) 25 g : 1 kg

Write these ratios in the form $n : 1$.

2 (a) 6 : 8 (b) 1 km : 2 cm (c) 3 h : $\frac{1}{2}$h (d) £3 : 40p
(e) 5l : 10 ml (f) 2 m : 2 mm (g) 1000 : 30 (h) 5p : 25p

Exercise 25C

1 Find x for each of these pairs of equivalent ratios:
(a) $x : 3$ 16 : 24 (b) 5 : 11 30 : x (c) 12 : 4 3 : x
(d) 16 : 8 $x : 1$ (e) 24 : 64 3 : x (f) 1 : 6 $x : 42$
(g) 36 : 9 $x : 1$ (h) 7 : x 35 : 40

2 An alloy contains iron and tungsten in the ratio 5 : 1. If there is 15 kg of iron in a quantity of the alloy, how much tungsten is there?

3 A concrete mix is made by adding sand and cement in the ratio 4 : 1. Five buckets of cement are put in a mixer.
How much sand is needed?

4 The ratio of girls to boys in a class is 5 : 4. There are 12 boys in the class.
How many girls are there?

5 The ratio of the lengths of two rectangles is 5 : 6. The length of the first rectangle is 12.5 cm.
What is the length of the second rectangle?

Exercise 25D

In questions 1, 2 and 3 divide the quantities in the ratios given.

1 **(a)** £14.91 in the ratio 2 : 5
(b) £45 in the ratio 4 : 5
(c) £51.92 in the ratio 2 : 9
(d) £170.52 in the ratio 1 : 4 : 7

2 **(a)** 600 g in the ratio 3 : 2
(b) 32 cm in the ratio 3 : 5
(c) 23.4 *l* in the ratio 1 : 5
(d) 34.65 m in the ratio 2 : 4 : 5

3 **(a)** 30.78 m in the ratio 4 : 5
(b) 75 cm in the ratio 3 : 2
(c) 48 kg in the ratio 3 : 5
(d) £357 in the ratio 1 : 2 : 4

4 The ratio of girls to boys in a class is 4 : 3. There are 28 pupils in the class.
Find how many are **(a)** girls **(b)** boys.

5 The angles of a triangle are in the ratio 6 : 5 : 7.
Find the sizes of the three angles. Remember: the angles of a triangle add to 180°.

6 Shortcrust pastry is made from flour and fat in the ratio 2 : 1.
How much flour do you need to make 600 g of pastry.

7 A business makes a profit of £660. The directors divide it in the ratio 3 : 4 : 8.
How much do they each receive?

8 An alloy is made from iron, copper, nickel and phosphorus in the ratio 6 : 4 : 3 : 1.
Find the weight of **(a)** copper **(b)** nickel in 714 g of the alloy.