

## Equivalent Ratios

### Starter

1. **(Review of last lesson)** For food, a catering van sells either burgers or hot dogs. At a concert, the van sold 920 meals, 560 of which were burgers.
- Express the ratio of burgers to hot dogs in its simplest form.
  - Let  $b$  = number of burgers and  $d$  = number of hot dogs sold. Find a formula for  $b$  in terms of  $d$ .
  - Using your formula from (b), calculate:
    - how many burgers would be sold if 747 hot dogs are sold
    - how many hot dogs would be expected to be sold if 938 burgers are sold,
  - The concert where 920 meals were sold had 3200 attendees. Based on these numbers, how many burgers and hot dogs should the catering van plan for if they were at a concert with 14720 people in the audience, given they would take 10% extras.

**Working:** (a) Number of hot dogs sold =  $920 - 560 = 360$   
 Burgers : Hot dogs  $\equiv 560 : 360 \equiv 14 : 9$

(b)  $b : d \equiv 14 : 9 \Rightarrow \frac{b}{14} = \frac{d}{9} \Rightarrow b = \frac{14d}{9}$

(c) (i)  $d = 747 \quad b = \frac{14 \times 747}{9} = 1162$   
 1162 burgers would be sold.

(ii)  $b = 938 \quad 938 = \frac{14 \times d}{9}$   
 $\frac{938 \times 9}{14} = 603$   
 603 hot dogs would be sold.

(d) This concert is  $\frac{14720}{3200} = 4.6$  times bigger.  
 Expected burgers sold =  $560 \times 4.6 = 2576$   
 Expected hot dogs sold =  $360 \times 4.6 = 1656$   
 Add 10% extra: Burgers =  $2576 + 258 = 2834$   
 Hot dogs =  $1656 + 166 = 1822$   
 The catering van should take about 2834 burgers and 1822 hot dogs.

2. Cancel the following fractions: (a)  $\frac{6}{8}$  (b)  $\frac{16}{56}$ .

**Working:** (a)  $\frac{3}{4}$  (b)  $\frac{2}{7}$

3. Cancel these ratios: (a) 63 : 54 (b) 2.4 : 40

**Working:** (a) Dividing both ratios by 9 gives 7 : 6  
(b) Multiply by 10 to get rid of the decimal 24 : 400  
Then cancel by dividing both ratios by 9 gives 3 : 50

**E.g. 1** Write each ratio in its simplest form:

- (a) 12 : 9 : 15 (b) 0.8 : 1.24 (c)  $2\frac{1}{5} : 3\frac{1}{4}$   
(d) 54 cm : 2 m (e) 25 minutes : 1 hour

**Working:** (a) Divide each ratio by 3 to get 4 : 3 : 5  
(b) Multiply each ratio by 100 to get integers 80 : 124  
Divide by 4 to get 20 : 31  
(c) Form improper fractions  $\frac{11}{5} : \frac{13}{4}$   
Get a common denominator  $\frac{44}{20} : \frac{65}{20}$   
Multiply by the common denominator 44 : 65  
(d) Make sure the units are the same (cm) 54 : 200  
Cancel the ratio by dividing by 2 27 : 100  
(e) Make sure the units are the same (min) 25 : 60  
Cancel the ratio by dividing by 5 5 : 12

- E.g. 2** (a) Express the ratio 4 : 15 in the form 1 :  $n$ .  
(b) Express the ratio 60 : 8 in the form  $n$  : 1.

**Working:** (a)  $4 : 15$   
*Divide by 4*  $\frac{4}{4} : \frac{15}{4}$   
 $1 : 3.75$   
(b)  $60 : 8$   
*Divide by 8*  $\frac{60}{8} : \frac{8}{8}$   
 $7.5 : 1$

**E.g. 3** The ratio of **bread to meat** in two brands of sausage are A 25 : 36 and B 40 : 67. Which has the higher proportion of meat? Explain your answer.

**Working:** Convert the ratios to 1 :  $n$

Sausage A: divide both ratios by 25

$$\frac{25}{25} : \frac{36}{25}$$
$$1 : 1.44 \text{ (3 s.f.)}$$

Sausage B: divide both ratios by 40

$$\frac{40}{40} : \frac{67}{40}$$
$$1 : 1.675$$

Sausage B has a higher proportion of meat because 1 : 1.675 is greater than 1 : 1.44.

**Video:** [Simplifying ratios](#)  
**Video:** [Expressing as 1 :  \$n\$](#)

[Solutions to Starter and E.g.s](#)

### Exercise

CIMT 8A p115 Ex 7.1 Qu 1ace..., 2ace..., 3ac, 4-12