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.
   (a) Express the ratio of burgers to hot dogs in it simplest form.
   (b) Let b = number of burgers and d = number of hot dogs sold. Find a formula for b in terms of d.
   (c) Using your formula from (b), calculate:
      (i) how many burgers would be sold if 747 hot dogs are sold
      (ii) how many hot dogs would be expected to be sold if 938 burgers are sold,
   (d) 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.

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

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

Notes

Cancelling ratios follows ***similar principles*** to ***cancelling fractions***.

Simplifying ratios with decimals: ***multiply by*** $10, 100, 1000$, etc to get whole numbers, then ***cancel*** the resulting ratio.

E.g. Simplify these ratios: (a) $0.6 : 4$ (b) $0.08 : 5.6$

Working:

(a) Multiply by 10 → $6 : 40$
Divide by 2 to simplify → $3 : 20$

(b) Multiply by 100 → $8 : 560$
Divide by 8 to simplify → $1 : 70$

Simplifying ratios with mixed units: ***convert to the smallest unit*** to avoid decimals, then ***cancel*** the resulting ratio.

E.g. Cancel these ratios: (a) 50 g : 1.3 kg (b) 3.2 mm : 4 cm

Working:

(a) Make sure the units are the same (g) → $50 : 1300$
$1 : 26$

(b) Make sure the units are the same (mm) → $3.2 : 40$
Multiply by 10 to get rid of the decimal → $32 : 400$
$2 : 25$

Simplifying ratios with fraction: ***find equivalent fractions*** with the ***same denominator***, then ***multiply by the common denominator***.

With ***mixed numbers*** express as improper fractions first then follow the method above.

E.g. Cancel these ratios: (a) $\frac{2}{5} : \frac{3}{4}$ (b) $4\frac{2}{3} : 1\frac{1}{2}$

Working: (a) Get a common denominator $\frac{8}{20} : \frac{15}{20}$

Multiply by 20 $8 : 15$

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

Expressing a ratio in the form $1 : n$ ***or*** $n : 1$

By expressing in the form $1 : n$ we can compare ratios easier.

E.g. Express $7 : 29$ in the form $1 : n$.

Working: Divide both ratios by 7: $\frac{7}{7} : \frac{29}{7}$

$1 : 4.14$ (3 s.f.)

E.g. 2 (a) Express the ratio $4 : 15$ in the form $1 : n$.

(b) Express the ratio $60 : 8$ in the form $n : 1$.

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.

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

Summary

Cancelling ratios follows ***similar principles*** to ***cancelling fractions***.

Simplifying ratios with decimals: ***multiply by*** $10, 100, 1000$, etc to get whole numbers, then ***cancel*** the resulting ratio.

Simplifying ratios with mixed units: ***convert to the smallest unit*** to avoid decimals, then ***cancel*** the resulting ratio.

Simplifying ratios with fraction: ***find equivalent fractions*** with the ***same denominator***, then ***multiply by the common denominator***.

With ***mixed numbers*** express as improper fractions first then follow the method above.