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*More challenging problems especially for advanced pupils.

EQUIVALENT RATIOS

Vocabulary



Equivalent Ratios Ratios that name the same comparison.

Example: $1 : 6$, $2 : 12$ and $3 : 18$ are equivalent ratios.

$$1 : 6 = 2 : 12 = 3 : 18$$

$1 : 6$ is a ratio in its simplest form.



How To

To find equivalent ratios, we multiply or divide terms of ratio by the same number.

- Express $6 : 4$ in its simplest form.

$$\begin{array}{c} 6 : 4 \\ \div 2 \quad \swarrow \quad \searrow \quad \div 2 \\ = 3 : 2 \end{array}$$

2 is a common factor of 6 and 4. So, divide 6 and 4 by 2.

- What is the missing number in the equivalent ratio?

$$15 : 27 = \square : 9$$

$$\begin{array}{c} 15 : 27 \\ \div 3 \quad \swarrow \quad \searrow \quad \div 3 \\ = ? : 9 \end{array}$$

$$27 \div 9 = 3$$

$$15 \div 3 = 5$$

The missing number is 5.

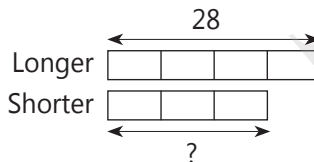
- A piece of ribbon is cut into two in the ratio of $4 : 3$. The longer piece is 28 cm long. What is the length of the shorter piece?

Method 1

$$\begin{array}{c} 4 : 3 \\ \times 7 \quad \swarrow \quad \searrow \quad \times 7 \\ = 28 : ? \end{array}$$

$$28 \div 4 \times 3 = 21 \text{ cm}$$

Method 2



$$4 \text{ units} \rightarrow 28$$

$$1 \text{ unit} \rightarrow 28 \div 4 = 7$$

$$3 \text{ units} \rightarrow 3 \times 7 = 21$$

The shorter piece is 21 cm long.

Exercise 6.2 EQUIVALENT RATIOS

1. Write each ratio in its simplest form.

a) $12 : 4 = \square : \square$

b) $6 : 15 = \square : \square$

c) $30 : 24 = \square : \square$

d) $20 : 100 = \square : \square$

e) $63 : 36 = \square : \square$

f) $72 : 56 = \square : \square$

2. Complete the equivalent ratios.

a) $4 : 5 = \square : 30$

b) $7 : 3 = 35 : \square$

c) $9 : 2 = \square : 10$

d) $5 : 8 = 40 : \square$

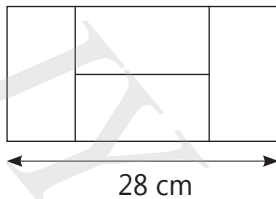
e) $12 : \square = 36 : 21$

f) $\square : 11 = 27 : 99$

3. Nelson spent 15 minutes doing his Mathematics homework and 2 hours doing his English homework. What is the ratio of the time he spent on Mathematics homework to the time he spent on English homework?

Exercise 6.5 CHALLENGES

- *1. The figure is made up of 4 identical rectangles.
What is the area of the figure?



- *2. The figure below is formed by two squares A and B.
The ratio of the unshaded area of Square A to the shaded area is 3 : 2.
The ratio of the unshaded area of Square B to the shaded area is 7 : 5.
The total area of the figure is 1170 cm^2 .
What is the area of Square A?

