

fs4u

Ratios

‘How To’ Booklet 26

Ratios

Writing a ratio in its simplest form.

A ratio can be simplified if all the numbers in the ratio have a common factor (can be divided by the same number).

NB ratios are usually expressed as whole numbers.

Example

- 1 $80 : 120 = 8 : 12$ (dividing both sides by 10 - knock the '0's off)
 $= 2 : 3$ (dividing both sides by 4 which is the highest common factor)
This is now in its simplest form.
- 2 $2 \frac{1}{2} : 3 \frac{1}{3}$ (multiply both sides by 6 ie the lowest common denominator)
 $= 2 \frac{1}{2} \times 6 : 3 \frac{1}{3} \times 6$
 $= 15 : 20$ (divide both sides by 5 the highest common factor) $= 3 : 4$
This is now in its simplest (whole number) form.

Dividing an amount in a given ratio

Example

- 1 Divide £140 in the ratio 3:4
The ratio 3 : 4 gives $3 + 4 = 7$ parts
So £140 has to be divided into 7 parts.
 $7 \text{ parts} = £140$
 $1 \text{ part} = £140 \div 7 = £20$
But the ratio is 3 parts; 4 parts = $3 \times £20 : 4 \times £20 = £60 : £80$
- 2 Divide £120 in the ratio 1 : 2 : 3 : 4
The total number of parts in this case is $1 + 2 + 3 + 4 = 10$
 $10 \text{ parts} = £120$
 $1 \text{ part} = £120 \div 10 = £12$
So the ratio becomes 1 part : 2 parts : 3 parts : 4 parts
 $= 1 \times £12 : 2 \times £12 : 3 \times £12 : 4 \times £12 = £12 : £24 : £36 : £48$
- 3 If a sum of money has been divided in the ratio 2: 3 : 4 and the smallest share is £18
What are:-
 - a the other shares?
 - b the total amount?The smallest share is 2 parts. So $2 \text{ parts} = £18$. Each part = $£18 \div 2 = £9$
The other shares are 3 parts and 4 parts. $3 \times £9$ and $4 \times £9 = £27$ & $£36$
The total amount is the sum of all the shares = $£18 + £27 + £36 = £81$

Expressing a ratio as a fraction

A ratio can be expressed as a fraction by putting the first number over the second

Example

Express the ratio 2 : 3 as a fraction

2 : 3 becomes $\frac{2}{3}$

Expressing a ratio as a decimal

A ratio can be expressed as a decimal by dividing the first number by the second.

Example

Express the ratio 4 : 5 as a decimal

4 : 5 becomes $4 \div 5 = 0.8$

Expressing a ratio as a percentage

A ratio can be expressed as a percentage by dividing the first number by the second and multiplying by 100.

Example

Express the ratio 7 : 10 as a percentage

7 : 10 becomes $(7 \div 10) \times 100 = 70\%$

Expressing a ratio in the form 1 : n

Express the ratio 4 inches : 10 feet in the form 1 : n

First each side of the ratio must be in the same units (in this case inches)

Activity

1 Express the following ratios in their simplest forms.

A 2 : 6

b 8 : 12

c 36 : 120

D 2 : 4 : 6

e 36 : 48 : 72

f 3.2 : 5.6

G 0.02 : 0.5

h $\frac{1}{2} : 1.8$

i $3\frac{1}{2} : 2\frac{1}{3}$