

Finding amounts from a ratio when one part is known

Worked solutions

GCSE Maths topic practice



This topic online

- 1 A recipe for flapjacks uses oats and butter in the ratio 5 : 2.

Beth uses 350 g of oats.

Work out how much butter she needs.

(2 marks)

$$5 \text{ parts} = 350 \text{ g}$$

$$1 \text{ part} = 350 \div 5 = 70 \text{ g}$$

Butter is 2 parts

$$2 \times 70 = 140$$

$$140 \text{ g}$$

- 2 A bag contains red, blue and green counters in the ratio 2 : 3 : 5.

There are 12 blue counters.

Work out the total number of counters in the bag.

(3 marks)

$$\text{Blue: } 3 \text{ parts} = 12$$

$$1 \text{ part} = 12 \div 3 = 4$$

Total parts

$$2 + 3 + 5 = 10$$

$$10 \times 4 = 40$$

$$40 \text{ counters}$$

- 3 In a gym class, the ratio of the number of men to the number of women is 4 : 5.

There are 20 men in the class.

Work out the total number of people in the class.

(2 marks)

$$4 \text{ parts represent } 20 \text{ men, so } 1 \text{ part} = 20 \div 4 = 5 \text{ people}$$

$$\text{Women} = 5 \text{ parts} = 5 \times 5 = 25$$

$$\text{Total} = 20 + 25 = 45 \text{ people}$$

$$45$$

4

Dev, Ella and Farid share some money.

The ratio of Dev's money to Ella's money is 1 : 3. The ratio of Ella's money to Farid's money is 3 : 2.

Ella has £45.

Work out how much money Farid has.

(3 marks)

Ella is 3 in both ratios, so join them

Dev : Ella : Farid = 1 : 3 : 2

Ella: 3 parts = £45

1 part = $45 \div 3 = £15$

Farid: $2 \times 15 = £30$

£30

5

In a fruit bowl there are apples, bananas and pears.

The ratio of apples to bananas is 3 : 2.

The ratio of bananas to pears is 4 : 3.

There are 24 apples in the bowl.

Work out the number of pears in the bowl.

(3 marks)

Make the banana parts match

apples : bananas = $3 : 2 = 6 : 4$

So apples

bananas : pears = $6 : 4 : 3$

6 parts = 24 apples, so 1 part = 4

Pears = 3 parts = $3 \times 4 = 12$

12

6

Ella, Fred and Grace share some money in the ratio 3 : 5 : 8.

Grace gets £35 more than Ella.

Work out the total amount of money they share.

(4 marks)

The difference between Grace's parts and Ella's parts is $8 - 3 = 5$ parts

5 parts = £35, so 1 part = £7

Total parts = $3 + 5 + 8 = 16$

Total = $16 \times £7 = £112$

£112

7

Aisha, Ben and Chloe share £420.

The ratio of Aisha's share to Ben's share is 2 : 3. The ratio of Ben's share to Chloe's share is 4 : 5.

Work out how much each person gets.

(4 marks)

Make Ben the same in both ratios (12)

$$A : B = 2 : 3 = 8 : 12$$

$$B : C = 4 : 5 = 12 : 15$$

$$A : B : C = 8 : 12 : 15$$

$$8 + 12 + 15 = 35 \text{ parts}$$

$$1 \text{ part} = 420 \div 35 = £12$$

$$\text{Aisha } 8 \times 12 = £96$$

$$\text{Ben } 12 \times 12 = £144$$

$$\text{Chloe } 15 \times 12 = £180$$

$$\boxed{\text{Aisha } £96, \text{ Ben } £144, \text{ Chloe } £180}$$

8

A school buys pens in packs of 12 and pencils in packs of 20.

The ratio of the number of packs of pens to the number of packs of pencils bought is 5 : 2.

Show that the ratio of the number of pens to the number of pencils bought is 3 : 2.

(4 marks)

Take 5 packs of pens and 2 packs of pencils

$$\text{Pens} = 5 \times 12 = 60. \text{ Pencils} = 2 \times 20 = 40$$

Pens

$$\text{pencils} = 60 : 40$$

Divide both parts by 20 to get 3 : 2, as required

9

The ratio of the amount of money Priya has to the amount of money Quinn has is 7 : 5.

Priya gives Quinn £18.

Now they each have the same amount of money.

Work out how much money Priya had originally.

(4 marks)

Let Priya have $7x$ and Quinn have $5x$

After the gift

$$7x - 18 = 5x + 18$$

$$2x = 36, \text{ so } x = 18$$

Priya originally had $7 \times 18 = £126$

Check

$126 - 18 = 108$ and $90 + 18 = 108$, which are equal

£126

10

Mo and Nia share £480 in the ratio 5 : 3.

Mo then gives £30 to Nia.

Work out the ratio of Mo's money to Nia's money now. Give your answer in its simplest form.

(4 marks)

$5 + 3 = 8$ parts

1 part = $480 \div 8 = £60$

Mo $5 \times 60 = £300$

Nia $3 \times 60 = £180$

After Mo gives £30 to Nia

Mo $300 - 30 = 270$

Nia $180 + 30 = 210$

$270 : 210$

Divide both by 30

9 : 7

- 11 In a box, the ratio of the number of red counters to the number of blue counters is 4 : 7.
12 more red counters are put into the box.
The ratio of the number of red counters to the number of blue counters is now 2 : 3.
Work out the number of blue counters in the box.

(4 marks)

Let there be $4x$ red and $7x$ blue counters at the start

After adding 12 red

$$(4x + 12) : 7x = 2 : 3$$

Cross multiply

$$3(4x + 12) = 2 \times 7x, \text{ so } 12x + 36 = 14x$$

$$2x = 36, \text{ so } x = 18$$

$$\text{Blue counters} = 7 \times 18 = 126$$

Check

$$\text{red} = 72 + 12 = 84, \text{ and } 84 : 126 = 2 : 3$$

126

- 12 Ravi, Sunita and Tom share £600 in the ratio 2 : 3 : 5.
Ravi gives 25% of his share to Tom. Sunita gives $\frac{1}{3}$ of her share to Tom.
Work out how much money Tom has now.

(5 marks)

$$2 + 3 + 5 = 10 \text{ parts}$$

$$1 \text{ part} = 600 \div 10 = \text{£}60$$

$$\text{Ravi } \text{£}120, \text{ Sunita } \text{£}180, \text{ Tom } \text{£}300$$

Ravi gives 25% of £120

$$120 \div 4 = \text{£}30$$

Sunita gives $\frac{1}{3}$ of £180

$$180 \div 3 = \text{£}60$$

$$300 + 30 + 60 = 390$$

£390

- 13 Leah and Sam share £480 in the ratio 5 : 7.

Sam gives 30% of his share to charity.

Leah gives £60 of her share to charity.

Sam gives more money to charity than Leah does.

Work out how much more.

(5 marks)

$$\begin{aligned}\text{Total parts} &= 5 + 7 = 12, \text{ so } 1 \text{ part} = 480 \div 12 = \text{£}40 \\ \text{Leah's share} &= 5 \times \text{£}40 = \text{£}200. \text{ Sam's share} = 7 \times \text{£}40 = \text{£}280\end{aligned}$$

$$\text{Sam gives } 30\% \text{ of } \text{£}280 = \text{£}84$$

$$\text{Leah gives } \text{£}60$$

$$\text{Difference} = 84 - 60 = \text{£}24$$

$$\boxed{\text{£}24}$$

- 14 A school has four classes, A, B, C and D, entering a competition.

The ratio of the number of pupils in A to the number in B is 2 : 3. The ratio of the number in B to the number in C is 6 : 5. The ratio of the number in C to the number in D is 10 : 7.

There are 21 pupils in class D.

Work out the number of pupils in class A.

(4 marks)

$$A : B = 2 : 3 = 4 : 6$$

$$B : C = 6 : 5$$

$$A : B : C = 4 : 6 : 5$$

$$\text{Make } C = 10 \text{ to match } C : D = 10 : 7$$

$$A : B : C = 8 : 12 : 10$$

$$A : B : C : D = 8 : 12 : 10 : 7$$

$$D: 7 \text{ parts} = 21$$

$$1 \text{ part} = 21 \div 7 = 3$$

$$A = 8 \times 3 = 24$$

$$\boxed{24 \text{ pupils}}$$