

Writing and Simplifying Ratios

Solutions

For Pearson Edexcel GCSE Mathematics (1MA1) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (2 marks)

A florist has 56 roses and 42 lilies.

Write down the ratio of the number of lilies to the number of roses.

Give your ratio in its simplest form.

lilies : roses = 42:56

The highest common factor (HCF) of 42 and 56 is 14.

Divide both parts by 14:

$42 \div 14 = 3$ and $56 \div 14 = 4$

Answer: 3 : 4

Tip: The question asks for lilies first. 4:3 is the ratio the wrong way round.

Marks: 1 mark for 42:56 or a partly simplified ratio, e.g. 21:28. 1 mark for 3:4.

2 (2 marks)

(a) Write the ratio 9 : 4 in the form $n : 1$

To make the second part 1, divide both parts by 4.

$9 \div 4 = 2.25$ and $4 \div 4 = 1$

Answer: 2.25 : 1

Tip: In the form $n:1$, the number n can be a decimal. Divide both parts by the second number.

(b) Write the ratio 8 : 28 in the form 1 : n

To make the first part 1, divide both parts by 8.

$$8 \div 8 = 1 \text{ and } 28 \div 8 = 3.5$$

Answer: 1 : 3.5

3 (2 marks)

65% of the area of a garden is lawn.

The rest of the garden is flower beds.

Write down the ratio of the area of lawn to the area of flower beds.

Give your ratio in its simplest form.

65% is lawn, so $100\% - 65\% = 35\%$ is flower beds.

lawn : flower beds = 65:35

Divide both parts by 5: 13:7

Answer: 13 : 7

Tip: Compare lawn with flower beds (65:35), not with the whole garden (65:100).

Marks: 1 mark for 65:35. 1 mark for 13:7.

4 (1 mark)

Write the ratio 3.6 : 0.8 in the form $n : 1$

To make the second part 1, divide both parts by 0.8.

$$3.6 \div 0.8 = 4.5 \text{ and } 0.8 \div 0.8 = 1$$

Answer: 4.5 : 1

5 (2 marks)

A builders' yard has 2250 red bricks, 1350 grey bricks and 900 yellow bricks.
Write down the ratio of the number of red bricks to the number of grey bricks to the number of yellow bricks.
Give your ratio in its simplest form.

red : grey : yellow = 2250:1350:900

Divide all three parts by 50: 45:27:18

Divide all three parts by 9: 5:3:2

5, 3 and 2 have no common factor, so this is the simplest form.

Answer: 5 : 3 : 2

Tip: Divide **all three** numbers by the same number each time. Keep going until the three numbers have no common factor.

Marks: 1 mark for 2250:1350:900 or a partly simplified ratio, e.g. 45:27:18. 1 mark for 5:3:2.

6 (2 marks)

A theatre has 150 seats.
For one show, 90 of the seats are taken.

Write down the ratio of the number of empty seats to the total number of seats.
Give your answer in its simplest form.

Empty seats = $150 - 90 = 60$

empty : total = 60:150

Divide both parts by 30: 2:5

Answer: 2 : 5

Tip: Read the question carefully: it compares empty seats with the **total**, so use 150, not the 90 taken seats.

Marks: 1 mark for 60:150. 1 mark for 2:5.

7 (2 marks)

Amir, Beth and Cal go running.

Amir runs 800 m.

Beth runs 2.4 km.

Cal runs half as far as Beth.

Find the ratio of the distance Amir runs to the distance Beth runs to the distance Cal runs.

Give your answer in its simplest form.

Use the same units: $2.4 \text{ km} = 2400 \text{ m}$

Cal runs $2400 \div 2 = 1200 \text{ m}$

Amir : Beth : Cal = 800:2400:1200

Divide all three parts by 400: 2:6:3

Answer: 2 : 6 : 3

Tip: Change all the distances to the same units before you write the ratio.

Marks: 1 mark for 2400 or 1200 (in metres). 1 mark for 2:6:3.

8 (3 marks)

A shop has 72 mugs.

Each mug is either plain or patterned.

The ratio of the number of plain mugs to the number of patterned mugs is 1 : 2

The shop sells 6 plain mugs and 18 patterned mugs.

Find the ratio of the number of plain mugs to the number of patterned mugs left in the shop.

Give your answer in its simplest form.

The ratio 1:2 has $1 + 2 = 3$ parts.

One part = $72 \div 3 = 24$

Plain mugs = 24 and patterned mugs = $2 \times 24 = 48$

Plain mugs left = $24 - 6 = 18$

Patterned mugs left = $48 - 18 = 30$

plain : patterned = 18:30

Divide both parts by 6: 3:5

Answer: 3 : 5

Tip: Work out how many of each type there are **before** taking away the mugs that are sold.

Marks: 1 mark for 24 and 48. 1 mark for 18:30. 1 mark for 3:5.

9 (2 marks)

A photo album has 96 photos.

36 of the photos are in colour. The rest are black and white.

Nell says,

‘The ratio of colour photos to black and white photos is 3 : 8’

Is Nell correct?

You must show how you get your answer.

Black and white photos = $96 - 36 = 60$

colour : black and white = 36:60

Divide both parts by 12: 3:5

3:5 is not 3:8, so Nell is **not** correct.

(Nell has used 36:96, which compares colour photos with **all** the photos.)

Answer: No, the ratio is 3 : 5

Tip: A ratio of one part to another part is different from a ratio of one part to the whole.

Marks: 1 mark for 60 or 36:60. 1 mark for No with 3:5.

10 (2 marks)

A bakery sells only wholemeal loaves and white loaves.

On Monday, $\frac{2}{7}$ of the loaves it sells are wholemeal.

Write down the ratio of the number of wholemeal loaves sold on Monday to the number of white loaves sold on Monday.

Give your answer in the form 1 : n

$\frac{2}{7}$ are wholemeal, so $\frac{5}{7}$ are white.

wholemeal : white = 2:5

Divide both parts by 2: 1:2.5

Answer: 1 : 2.5

Tip: $\frac{2}{7}$ wholemeal does not mean wholemeal : white = 2:7. It means 2 out of every 7 loaves are wholemeal, so 5 out of 7 are white.

Marks: 1 mark for 2:5. 1 mark for 1:2.5.
