

Proportion - Recipes and the Unitary Method

Solutions

For AQA GCSE Mathematics (8300) • 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 (3 marks)

Here is a recipe for vegetable curry.

Vegetable curry (serves 4)

Potatoes	600 g
Coconut milk	400 ml
Onions	2

Imran is making vegetable curry for 6 people.

Work out how much of each ingredient he needs.

Potatoes _____ g

Coconut milk _____ ml

Onions _____

The recipe serves 4 people. Imran needs enough for 6 people.

Scale factor = $6 \div 4 = 1.5$

So multiply every amount by 1.5.

Potatoes: $600 \times 1.5 = 900$ g

Coconut milk: $400 \times 1.5 = 600$ ml

Onions: $2 \times 1.5 = 3$

Answer: 900 g, 600 ml, 3 onions

Tip: Don't add 2 to each amount because there are 2 more people. Multiply every amount by the scale factor $6 \div 4 = 1.5$.

Marks: 1 mark for $\times 1.5$ (or $\div 4 \times 6$). 1 mark for two correct amounts. 1 mark for all three correct.

2 (2 marks)

A pasta bake for 5 people uses 350 g of pasta.
Gwen makes a larger pasta bake using the same recipe.
She uses 490 g of pasta.
How many people is Gwen's pasta bake for?

Pasta for 1 person = $350 \div 5 = 70$ g

Number of people = $490 \div 70 = 7$

Answer: 7 people

Tip: Find the amount for 1 person first, then see how many of those fit into 490 g.

Marks: 1 mark for $350 \div 5$ (or $490 \div 350 = 1.4$). 1 mark for 7.

3 (2 marks)

5 pens cost £3.40
Work out the cost of 8 pens.
Unitary method: find the cost of 1 pen first.
 $1 \text{ pen} = 3.40 \div 5 = £0.68$
 $8 \text{ pens} = 8 \times 0.68 = £5.44$

Answer: £5.44

Marks: 1 mark for $3.40 \div 5$. 1 mark for £5.44.

4 (4 marks)

A machine puts labels on jars.

It labels 75 jars every 6 minutes.

The machine starts at 10:45 am and needs to label 1500 jars.

It also stops once for a 15-minute break.

At what time does the machine finish?

The machine labels 75 jars every 6 minutes.

Number of lots of 75 jars = $1500 \div 75 = 20$

Labelling time = $20 \times 6 = 120$ minutes

Add the break: $120 + 15 = 135$ minutes

135 minutes = 2 hours 15 minutes

10:45 am + 2 hours 15 minutes = 1:00 pm

Answer: 1:00 pm

Tip: 135 minutes is 2 hours 15 minutes, not 1 hour 35 minutes. There are 60 minutes in an hour.

Marks: 1 mark for $1500 \div 75$ (or $75 \div 6 = 12.5$ jars per minute). 1 mark for 120 minutes. 1 mark for adding the 15-minute break. 1 mark for 1:00 pm.

5 (3 marks)

A rice dish for 8 people uses 300 g of rice.

Jo has 1 kg of rice.

What is the greatest number of people Jo can make this rice dish for?

Rice for 1 person = $300 \div 8 = 37.5$ g

Jo has 1 kg = 1000 g of rice.

$1000 \div 37.5 = 26.6 \dots$

There is not enough rice for 27 people, so the answer is 26.

Answer: 26

Marks: 1 mark for 37.5. 1 mark for $1000 \div 37.5$. 1 mark for 26.

6 (2 marks)

A car uses 12 litres of fuel to travel 150 km.
How much fuel will it use to travel 400 km?

Fuel for 1 km = $12 \div 150 = 0.08$ litres

Fuel for 400 km = $0.08 \times 400 = 32$ litres

Answer: 32 litres

Marks: 1 mark for $12 \div 150$ (or another correct method). 1 mark for 32.

7 (4 marks)

Here are the ingredients needed to make 10 glasses of fruit punch.

10 glasses of fruit punch	
Orange juice	400 ml
Pineapple juice	250 ml
Lemonade	150 ml

Bethan has 1.5 litres of orange juice, 1 litre of pineapple juice and 500 ml of lemonade.

What is the greatest number of glasses of fruit punch Bethan can make?
You must show your working.

Change litres to millilitres: 1.5 litres = 1500 ml and 1 litre = 1000 ml.

Amounts for 1 glass: orange $400 \div 10 = 40$ ml, pineapple $250 \div 10 = 25$ ml, lemonade $150 \div 10 = 15$ ml.

Orange juice: $1500 \div 40 = 37.5$, so enough for 37 glasses.

Pineapple juice: $1000 \div 25 = 40$ glasses.

Lemonade: $500 \div 15 = 33.3 \dots$, so enough for 33 glasses.

The lemonade runs out first, so she can make 33 glasses.

Answer: 33

Tip: Check **every** ingredient. The one that runs out first decides the answer, and you must round **down**: 33.3 ... gives 33 full glasses.

Marks: 1 mark for changing litres to ml. 1 mark for one correct comparison. 1 mark for all three compared. 1 mark for 33.
