

1 Heidi wants to make some biscuits using this recipe.

Makes 12 biscuits
125 g butter
200 g flour
50 g sugar

Heidi thinks that she has,

500 g butter
700 g flour
250 g sugar

Assuming that these weights are correct,

- (a) work out the greatest number of biscuits Heidi can make.
You must show all your working.

1 batch = 12 biscuits

$$\begin{aligned} \text{For 500g butter} &: \frac{500 \text{ g}}{125 \text{ g}} = 4 \text{ batch} \\ &= 4 \times 12 = 48 \text{ biscuits} \end{aligned}$$

$$\begin{aligned} \text{For 700 g flour} &: \frac{700 \text{ g}}{200 \text{ g}} = 3.5 \text{ batch} \\ &= 3.5 \times 12 = 42 \text{ biscuits} \end{aligned}$$

$$\begin{aligned} \text{For 250 g sugar} &: \frac{250 \text{ g}}{50 \text{ g}} = 5 \text{ batch} \\ &= 5 \times 12 = 60 \text{ biscuits} \end{aligned}$$

$$\begin{array}{r} 3.5 \\ 200 \overline{) 7000} \\ \underline{600} \\ 1000 \\ \underline{1000} \\ 0 \end{array}$$

she can only make
a max of 42 because
she only has enough
flour for 42

42

(4)

Heidi is wrong.

She has more than 250g of sugar.

∴ Heidi can make maximum of 42 biscuits.

- (b) Does this affect the greatest number of biscuits Heidi can make?
Give a reason for your answer.

No. She only has flour enough to make 42 biscuits

①

The flour is the limiting factor

(1)

(Total for Question 1 is 5 marks)

2 Natalie makes potato cakes in a restaurant.

She mixes potato, cheese and onion so that

$$\text{weight of potato} : \text{weight of cheese} : \text{weight of onion} = 9 : 2 : 1$$

Natalie needs to make 6000 g of potato cakes.

Cheese costs £2.25 for 175 g.

Work out the cost of the cheese needed to make 6000 g of potato cakes.

Ratio of weight of potato, cheese and onion.

$$\text{Total ratio} = 9 + 2 + 1 = 12 \quad (1)$$

Amount of cheese needed for 6000 g of cakes.

$$\text{Cheese ratio for the cake} = \frac{2}{12} = \frac{1}{6}$$

$$\begin{aligned} \text{For 6000 g of cake} &= \frac{1}{6} \times 6000 \text{ g} \\ &= 1000 \text{ g of cheese} \end{aligned}$$

Cost of cheese to make 6000 g of cakes

$$175 \text{ g} = \text{£} 2.25$$

$$1000 \text{ g} = x$$

$$x = \frac{1000 \text{ g}}{175 \text{ g}} \times \text{£} 2.25 \quad (1)$$

$$= 5.71 \times \text{£} 2.25 \quad (1)$$

$$= 12.86 \quad (1)$$

£.....12.86

(Total for Question 2 is 4 marks)

3 Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones

75 g	butter
350 g	self-raising flour
40 g	sugar
150 ml	milk
2	eggs

Mia wants to make 25 scones.

Work out how much sugar she needs.

Find the scale factor:

$$25 \div 10 = 2.5 \text{ (1)}$$

This means all ingredients must be multiplied by 2.5 to make 25 scones.

$$40\text{g} \times 2.5$$

$$= 100\text{g} \text{ (1)}$$

..... 100 g

(Total for Question 3 is 2 marks)

4 Jo is going to buy 15 rolls of wallpaper.

Here is some information about the cost of rolls of wallpaper from each of two shops.

<p>Chic Decor</p> <p>3 rolls for £36</p>

<p>Style Papers</p> <p>Pack of 5 rolls normal price £70</p> <p>12% off the normal price</p>
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Jo wants to buy the 15 rolls of wallpaper as cheaply as possible.

Should Jo buy the wallpaper from Chic Decor or from Style Papers?

You must show how you get your answer.

Price for Chic Decor

For 3 : 3 for £36

$$\text{For 15 : } \frac{15}{3} \times \text{£}36 = \text{£}180 \quad (1)$$

Price for Style Papers

$$\begin{aligned} \text{Discounted Price : } & 0.12 \times \text{£}70 = \text{£}8.40 \quad (1) \\ \text{for 5 rolls} & \quad \text{£}70 - \text{£}8.40 \\ & = \text{£}61.60 \quad (1) \end{aligned}$$

For 5 : 5 for £61.60

$$\text{For 15 : } \frac{15}{5} \times \text{£}61.60 = \text{£}184.80 \quad (1)$$

∴ Jo should buy from Chic Decor.

(Total for Question 4 is 4 marks)

- 5 Jessica runs for 15 minutes at an average speed of 6 miles per hour.
She then runs for 40 minutes at an average speed of 9 miles per hour.

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

It takes Amy 45 minutes to run the same total distance that Jessica runs. $\text{distance} = \text{speed} \times \text{time}$

Work out Amy's average speed.
Give your answer in miles per hour.

$$1 \text{ hour} = 60 \text{ minutes}$$

Jessica :

$$\text{First run : } 6 \text{ miles/h} \times \frac{15}{60} \text{ h} = 1.5 \text{ miles}$$

$$\text{Second run : } 9 \text{ miles/h} \times \frac{40}{60} \text{ h} = 6 \text{ miles} \quad (1)$$

$$\text{Total distance} = 1.5 + 6 = 7.5 \text{ miles} \quad (1)$$

Amy

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{7.5 \text{ miles}}{\frac{45}{60} \text{ h}} \quad (1)$$

$$= 10 \text{ miles/h} \quad (1)$$

10

..... miles per hour

(Total for Question 5 is 4 marks)

- 6 214 people go on a school trip.
The people on the trip are either adults or children.

There are 14 adults on the trip.
35% of the children on the trip are wearing a hat.

Find the number of children on the trip who are **not** wearing a hat.

Finding the number of children on the trip :

$$\begin{aligned}\text{Number of Children} &= \text{Total} - \text{number of adult} \\ &= 214 - 14 = 200 \quad (1)\end{aligned}$$

Finding percentage of children who are not wearing a hat :

$$100\% - 35\% = 65\% \quad (1)$$

$$\text{Number of children not wearing hat} = \frac{65}{100} \times 200 = 130 \quad (1)$$

(Total for Question 6 is 4 marks)

7 A shop has two different special offers on milk.

MILK A



75p

Pay for 2 bottles
get 1 bottle free

MILK B



£1.28

Pay for 1 bottle
get 1 bottle half price

Which offer gives the better value for money?
You must show how you get your answer.

$$\begin{aligned} \text{MILK A : pints : } & 2 \times 2 + 2 = 6 \\ \text{price : } & 2 \times 75\text{p} = \text{£}1.5 \quad (1) \end{aligned}$$

$$\begin{aligned} \text{MILK B : pints : } & 4 \times 1 + 4 = 8 \\ \text{price : } & \text{£}1.28 + \text{£}0.64 = \text{£}1.92 \quad (1) \end{aligned}$$

Finding Price per pints for both milk :

$$\text{milk A : } \frac{\text{£}1.5}{6} = \text{£}0.25 \text{ per pint} \quad (1)$$

$$\text{milk B : } \frac{\text{£}1.92}{8} = \text{£}0.24 \text{ per pint}$$

\therefore MILK B (4 pints) offer better value for money (1)

(Total for Question 7 is 4 marks)

$$\begin{array}{r} 0.25 \\ 6 \overline{) 1.5} \\ \underline{-0} \\ 1.5 \\ \underline{-1.2} \\ 30 \end{array}$$

$$\begin{array}{r} 0.24 \\ 8 \overline{) 1.92} \\ \underline{-1.6} \\ 32 \\ \underline{-32} \\ 0 \end{array}$$

- 8 2.5 kg of onions and 2 kg of carrots cost a total of £2.36
3 kg of carrots cost £1.74

Stuart has £2

He wants to buy 4 kg of onions.

Does Stuart have enough money to buy 4 kg of onions?

You must show how you get your answer.

Finding the cost of 1 kg of onions :

$$\text{cost of 1 kg of carrots} = \frac{\pounds 1.74}{3} = \pounds 0.58 \quad (1)$$

$$2.5 \text{ kg of onion} + 2 \text{ kg of carrots} = \pounds 2.36$$

$$\begin{aligned} 2.5 \text{ kg of onion} &= \pounds 2.36 - 2(\pounds 0.58) \\ &= \pounds 1.2 \quad (1) \end{aligned}$$

$$1 \text{ kg of onion} = \frac{\pounds 1.2}{2.5} = \pounds 0.48 \quad (1)$$

Finding cost to buy 4 kg of onions :

$$4 \times \pounds 0.48 = \pounds 1.92 \quad (1)$$

\therefore Yes, Stuart has 8 p left. (1)

(Total for Question 8 is 5 marks)

9 Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones

80 g butter
350 g self-raising flour
30 g sugar
2 eggs

Martin has

100 g butter
1 kg self-raising flour
50 g sugar
4 eggs

Martin wants to make 25 scones.

He has not got enough of some of the ingredients.

Work out how much more of each of these ingredients he needs.

Finding scale factors of the scone :

$$\frac{25}{10} = 2.5$$

To make 25 scones, she needs :

$$\text{Butter} : 80 \text{ g} \times 2.5 = 200 \text{ g} \quad (1)$$

$$\text{Self raising flour} : 350 \text{ g} \times 2.5 = 875 \text{ g} \quad (1)$$

$$\text{Sugar} : 30 \text{ g} \times 2.5 = 75 \text{ g}$$

$$\text{Egg} : 2 \times 2.5 = 5 \text{ eggs}$$

Finding the amount of ingredients she needs more :

$$\text{Butter} : 200 - 100 = 100 \text{ g} \quad (1)$$

$$\text{Sugar} : 75 - 50 = 25 \text{ g}$$

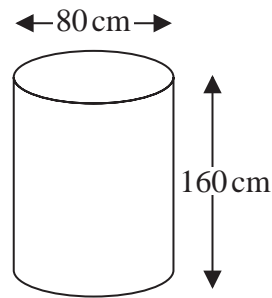
$$\text{Egg} : 5 - 4 = 1 \text{ egg} \quad (1)$$

Self raising flour is enough

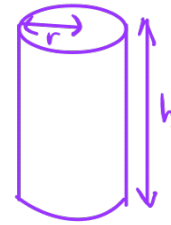
(Total for Question 9 is 4 marks)

10 Karina has 4 tanks on her tractor.

Each tank is a cylinder with diameter 80 cm and height 160 cm.



Volume of cylinder : $\pi \times r^2 \times h$



The 4 tanks are to be filled completely with a mixture of fertiliser and water.

The fertiliser has to be mixed with water in the ratio 1 : 100 by volume.

Karina has 32 litres of fertiliser.

1 litre = 1000 cm³

Has Karina enough fertiliser for the 4 tanks?

You must show how you get your answer.

Finding volume of a tank :

$$\pi \times r^2 \times h = \pi \times 40^2 \times 160 = 256\,000\pi \quad (1)$$

Finding volume of 4 tanks :

$$4 \times 256\,000\pi = 1\,024\,000\pi \quad (1)$$

Finding the amount of mixture for 1 tank :

$$\frac{256\,000\pi}{(100+1)} = \frac{256\,000\pi}{101} = 7962.8 \text{ cm}^3$$

$$4 \text{ tanks} : 7962.8 \times 4 = 31851.4 \text{ cm}^3 \quad (1)$$

Fertiliser Karina has :

$$32 \times 1000 \text{ cm}^3 = 32000 \text{ cm}^3$$

Yes. Karina has 32000 cm³ to fill in 31851.4 cm³ of tank.

(1)

(Total for Question 10 is 4 marks)

11 Here is the list of ingredients for making 20 biscuits.

Ingredients for 20 biscuits

150 g butter
100 g sugar
250 g flour

Harry wants to make 60 biscuits.

How much flour does Harry need?

250 g for 20 biscuits
↓ × 3 ↓ × 3
750 g for 60 biscuits ✓ ①

750 g ✓ ①

(Total for Question 11 is 2 marks)

12 Asha buys 180 cans of cola.

The cans are sold in packs.

There are 12 cans in each pack.

Each pack costs £3

(a) Work out the total cost of the cola Asha buys.

Finding number of packs Asha buys :

$$\frac{180}{12} = 15 \text{ packs } \textcircled{1}$$

∴ If 1 pack costs £3, 15 packs cost :

$$15 \times \text{£}3 = \text{£}45 \textcircled{1}$$

$$\text{£} \frac{45}{(3)}$$

Ethan buys a box of 24 cans of lemonade for £7

There are 330 ml of lemonade in each can.

(b) Work out the cost of 100 ml of lemonade.

Give your answer correct to the nearest penny.

Finding price of each can :

$$\frac{\text{£}7}{24} = \text{£}0.2916 \dots \text{ (per can)} \textcircled{1}$$

∴ 330 ml of lemonade (1 can) costs £0.2916 ...

100 ml of lemonade costs :

$$\frac{100}{330} \times \text{£}0.2916 \dots = \text{£}0.08838 \dots \textcircled{1}$$

Convert to penny :

$$0.08838 \times 100 = 8.838 \dots$$

$$= 9 \text{ (nearest penny)} \textcircled{1}$$



(Total for Question 12 is 6 marks)

- 13 120 boxes cost £6
270 bags cost £10

A bag is cheaper than a box.

How much cheaper?

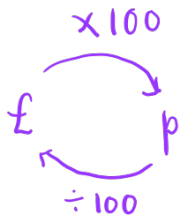
Give your answer in pence correct to 1 decimal place.

$$6 \div 120 = \text{£}0.05 \text{ per box } \textcircled{1}$$

$$10 \div 270 = \text{£}0.037 \text{ per bag } \textcircled{1}$$

$$\text{£}0.05 - \text{£}0.037 = \text{£}0.013 \textcircled{1}$$

$$\text{£}0.013 \times 100 = 1.3 \text{ pence}$$



1.3 $\textcircled{1}$

.....p

(Total for Question 13 is 4 marks)

14 There are only red beads and green beads in a bag.

number of red beads : number of green beads = 1 : 4

There are 35 red beads in the bag.

Work out the total number of beads in the bag.

$$1 \text{ proportion} = 35$$

$$\text{total proportion} = 1 + 4 = 5$$

$$35 \times 5 = 175 \text{ beads}$$

①

175 ①

(Total for Question 14 is 2 marks)

15 It takes 14 hours for 5 identical pumps to fill a water tank.

How many hours would it take 4 of these pumps to fill another water tank of the same size?

Finding total time for 1 pump to fill the tank:

$$14 \text{ hours} \times 5 = 70 \text{ hours} \text{ (1)}$$

Finding the time if 4 pumps are used:

$$\frac{70 \text{ hours}}{4} = 17.5 \text{ (1)}$$

..... 17.5 hours

(Total for Question 15 is 2 marks)