

GCSE
MATHEMATICS (8300)
FOUNDATION
Ratio, proportion and rates of change

Total number of marks: 35 per optional item

Q6

The cost of 3 calendars is £18

Work out the cost of 5 calendars.

(Total 2 marks)

$$\begin{aligned} 3 &= \text{£}18 \\ \Rightarrow 1 &= \text{£}6 \\ \therefore 5 &= \underline{\underline{\text{£}30}} \end{aligned}$$

Q11a

Here is a list of ingredients needed to make 6 pancakes.

| | |
|-------|-----------------|
| Flour | 120 grams |
| Eggs | 2 |
| Milk | 210 millilitres |

$$\frac{9}{6} = \frac{3}{2} \quad \text{so multiply everything by } \frac{3}{2}$$

(a) Complete the list of ingredients needed to make 9 pancakes.

| | |
|-------|---------------|
| Flour | <u>180g</u> |
| Eggs | <u>3</u> |
| Milk | <u>315 ml</u> |

(Total 3 marks)

Q12

A bottle contains 1.5 litres of water.

650 millilitres of the water is poured into a jug.

How much water is left in the bottle?

State the units of your answer.

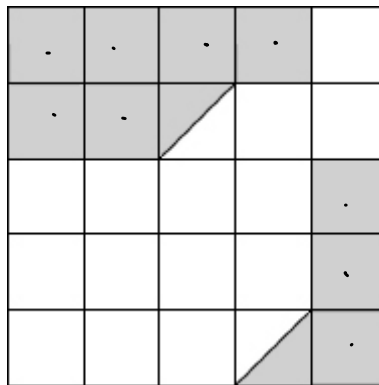
$$1.5 \text{ l} = 1500 \text{ ml}$$

(Total 3 marks)

$$1500 - 650 = \underline{\underline{850 \text{ ml}}} \text{ left in bottle.}$$

Q9

What percentage of this shape is shaded?



$$\begin{aligned} \text{Total} &= 25 \text{ squares} \\ 10 \text{ squares are shaded.} \\ \Rightarrow \frac{10}{25} &= \frac{2}{5} \times 100 \\ &= 40\% \end{aligned}$$

Answer 40 %

(Total 2 marks)

Q13

The cost of 5 kg of potatoes is £3.20

$$1 \text{ kg} = 0.64 \quad [3.20 \div 5]$$

The cost of $\frac{1}{2}$ kg of carrots is 29p

$$1 \text{ kg} = 58 \text{ p} \quad [29 \times 2]$$

Work out the **total** cost of 12 kg of potatoes and $1\frac{1}{2}$ kg of carrots.

(Total 3 marks)

$$\begin{aligned} & (64 \text{ p} \times 12) + (1.5 \times 58 \text{ p}) \\ \Rightarrow & 855 \text{ p} = \underline{\underline{\pounds 8.55}} \end{aligned}$$

Q17a

(a) Simplify fully $56 : 24$ Answer 7 : 3

$$\begin{aligned} & 56 : 24 \\ \div 2 \downarrow & \\ & 28 : 12 \\ \div 2 \downarrow & \\ & 14 : 6 \xrightarrow{\div 2} 7 : 3 \end{aligned}$$

(Total 2 marks)

Q9

In this question, use

1 foot = 12 inches

1 inch = 2.5 centimetres

$$\begin{aligned} 5 \text{ feet} &= 60 \text{ inches} \\ 60 + 8 &= 68 \text{ inches} \\ 68 \times 2.5 &= 170 \text{ cm} \end{aligned}$$

Change 5 feet 8 inches to centimetres.

Answer = 170 cm

(Total 3 marks)

Q19a

$$120 \div 5 = 24$$

- (a) Divide 120 in the ratio 1 : 4

$$24 : 96$$

$$6 : 24$$

$$3 : 12$$

$$1 : 4$$

Answer 24 : 96

(Total 2 marks)

Q18a

Mo played 30 games of chess.

He won 18 of these games.

$$\frac{18}{30} = \frac{9}{15} = \frac{3}{5}$$

- (a) What fraction of the games did he win?

Give your answer in its simplest form.

(Total 2 marks)

Q18b

Mo played 30 games of chess.

He won 18 of these games.

- (b) He played 20 more games.

He had then won 64% of **all** of his games.

How many of the 20 games did he win?

50 games in total

$$0.64 \times 50 = 32 \text{ games won in total}$$

(Total 3 marks)

$$32 - 18 = \underline{\underline{14}} \text{ games won of the 20}$$

Q22

Anna plays a computer game.

Each game is a win or a loss.

She wins three quarters of her first 24 games.

She then wins her next 12 games.

For all 36 games, work out the ratio wins : losses

Give your answer in its simplest form.

Answer 5 : 1

$$\frac{3}{4} \times 24 = 18 \text{ games won.}$$

$$18 + 12 = 30$$

$$\text{wins : losses} \Rightarrow 30 : 6$$

$$10 : 2$$

$$5 : 1$$

(Total 3 marks)

Q27

$$x : y = 1 : 3$$

Circle the correct equation.

$$y = 3x$$

$$y = \frac{x}{3}$$

$$y = x - 2$$

$$y = x + 2$$

(Total 1 mark)

$$x : y \Rightarrow \frac{x}{y} = \frac{1}{3} \Rightarrow y = 3x$$

Q22

$$x : y = 7 : 4$$

$$x : y = 7 : 4 \Rightarrow \frac{x}{y} = \frac{7}{4} \Rightarrow y = \frac{4}{7}x$$

$$x + y = 88 \rightarrow y = 88 - x$$

Work out the value of $x - y$

$$88 - x = \frac{4}{7}x$$

$$616 - 7x = 4x$$

$$\Rightarrow x = 56$$

$$\therefore y = 88 - 56 = 32$$

$$x - y = 56 - 32 = 24$$

(Total 3 marks)

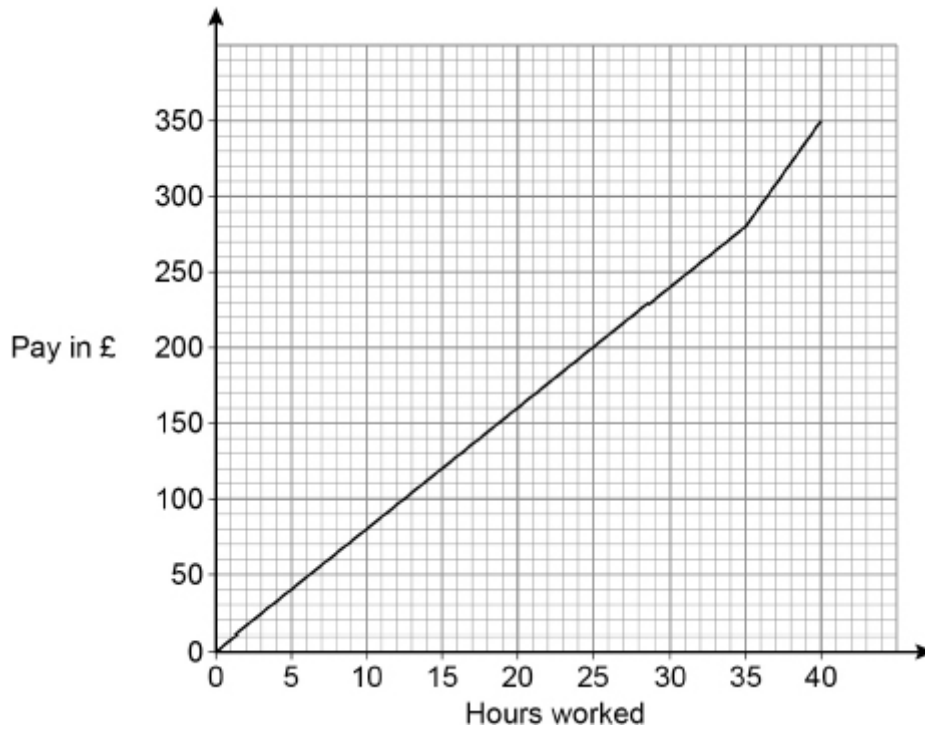
Q29

The graph shows how much Molly is paid for working for up to 40 hours.

She receives

a basic rate of pay for the first 35 hours worked

a higher rate of pay for the next 5 hours worked.



Work out the difference between the higher rate of pay and the basic rate of pay.

Give your answer in £ per hour.

Answer £ 6 per hour

$$\text{basic rate : } \frac{280}{35} = \text{£}8 \text{ per hour}$$

(Total 3 marks)

$$\text{higher rate : } \frac{70}{5} = \text{£}14 \text{ per hour}$$

$$14 - 8 = \text{£}6 \text{ difference}$$