

GCSE Grade 6

Maths

Booklet 5

Paper 3H
Calculator

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- 1 A person's breathes approximately 10^4 times each day.
A person lives for approximately 81 years.

- (a) Work out an estimate for the number of times a person breathes in their lifetime.
Give your answer in standard form correct to 2 significant figures.

.....
(2)

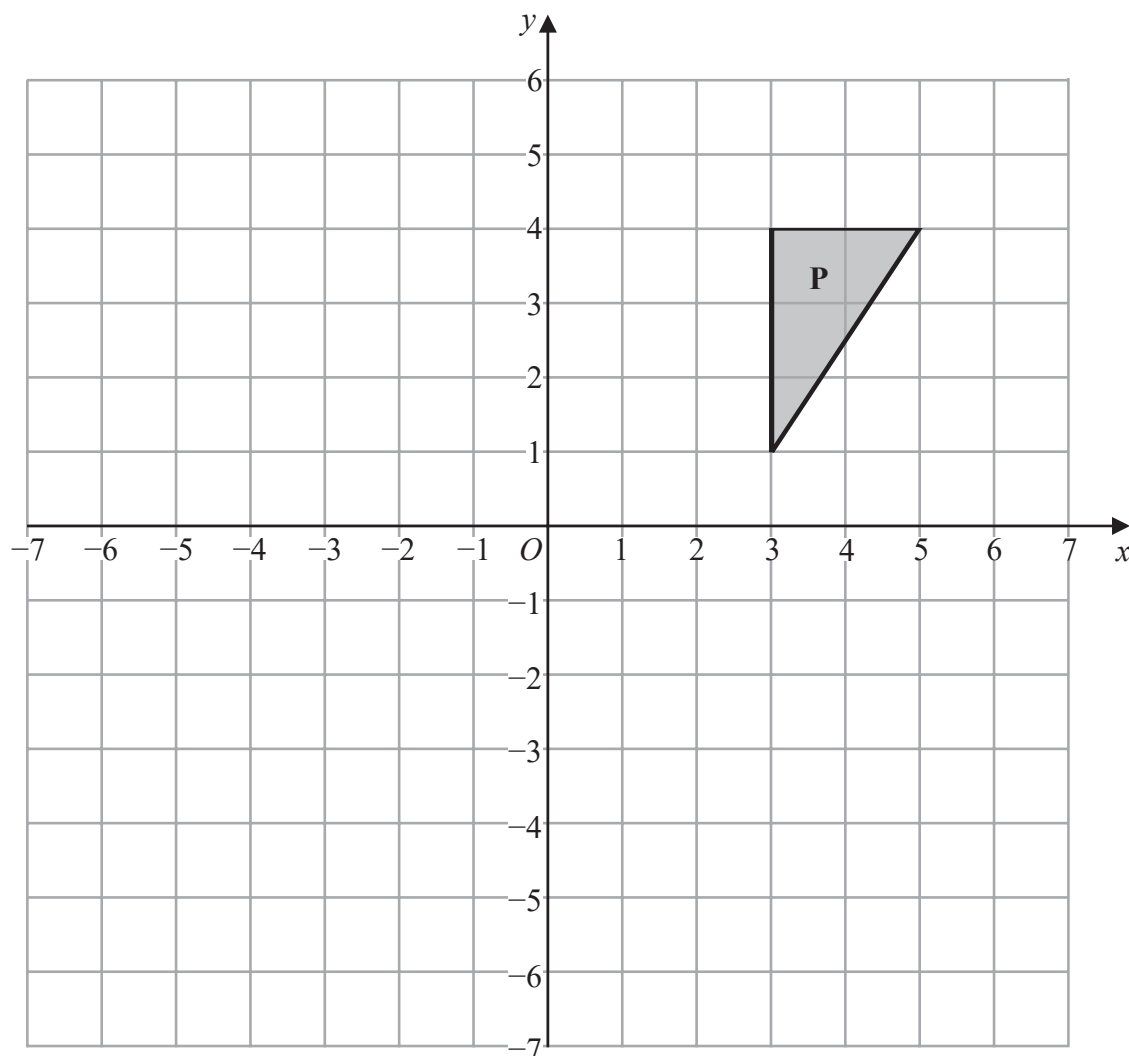
9×10^{28} electrons have a total mass of 80 grams.

- (b) Work out the average mass of 1 electron.
Give your answer in standard form.

..... grams
(2)

(Total for Question 1 is 4 marks)

2 The diagram shows a triangle **P** on a grid.



Triangle **P** is rotated 180° about $(0, 0)$ to give triangle **Q**.

Triangle **Q** is translated by $\begin{pmatrix} 6 \\ -2 \end{pmatrix}$ to give triangle **R**.

(a) Describe fully the single transformation that maps triangle **P** onto triangle **R**.

(3)

Under the transformation that maps triangle **P** onto triangle **R**, the point *A* is invariant.

(b) Write down the coordinates of point *A*.

(.....,)
(1)

(Total for Question 2 is 4 marks)

3 Express $\frac{2}{5-x} + \frac{3}{x+7}$ as a single fraction in its simplest form.

.....
(3)

(b) Expand and simplify $(x-4)(4x+5)(3x+1)$

.....
(3)

(Total for Question 3 is 6 marks)

4 Jack bought a new boat for £22 600

The value, £ V , of Jack's boat at the end of n years is given by the formula

$$V = 22\,600 \times (0.88)^n$$

- (a) At the end of how many years was the value of Jack's boat first less than 40% of the value of the boat when it was new?

.....
(2)

A savings account pays interest at a rate of $R\%$ per year.

Jack invests £12 400 in the account for one year.

At the end of the year, Jack pays tax on the interest at a rate of 20%.

After paying tax, he gets £843.20

- (b) Work out the value of R .

.....
(3)

(Total for Question 4 is 5 marks)

- 5 There are only blue counters, yellow counters, green counters and red counters in a bag. A counter is taken at random from the bag.

The table shows the probabilities of getting a blue counter or a yellow counter or a green counter.

Colour	blue	yellow	green	red
Probability	0.12	0.26	0.3	

- (a) Work out the probability of getting a red counter.

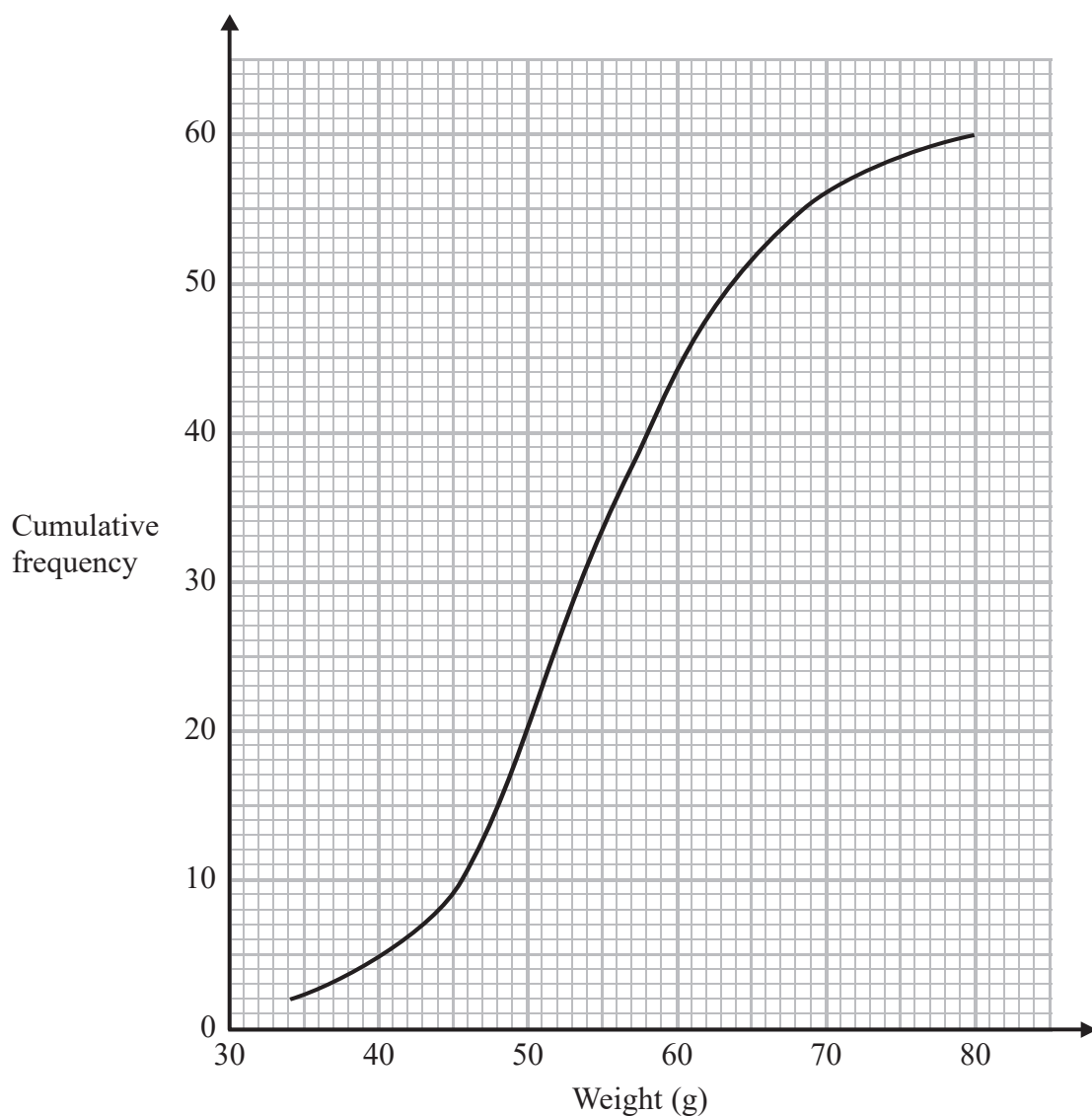
.....
(1)

- (b) What is the least possible number of counters in the bag?
You must give a reason for your answer.

.....
.....
(2)

(Total for Question 5 is 3 marks)

- 6 The cumulative frequency graph shows information about the weights of 60 potatoes.



- (a) Use the graph to find an estimate for the median weight.

..... g
(1)

Jamil says,

“ $80 - 35 = 45$ so the range of the weights is 45g.”

- (b) Is Jamil correct?

You must give a reason for your answer.

.....
.....
(1)

(c) Show that less than 20% of the potatoes have a weight greater than 60 g.

(2)

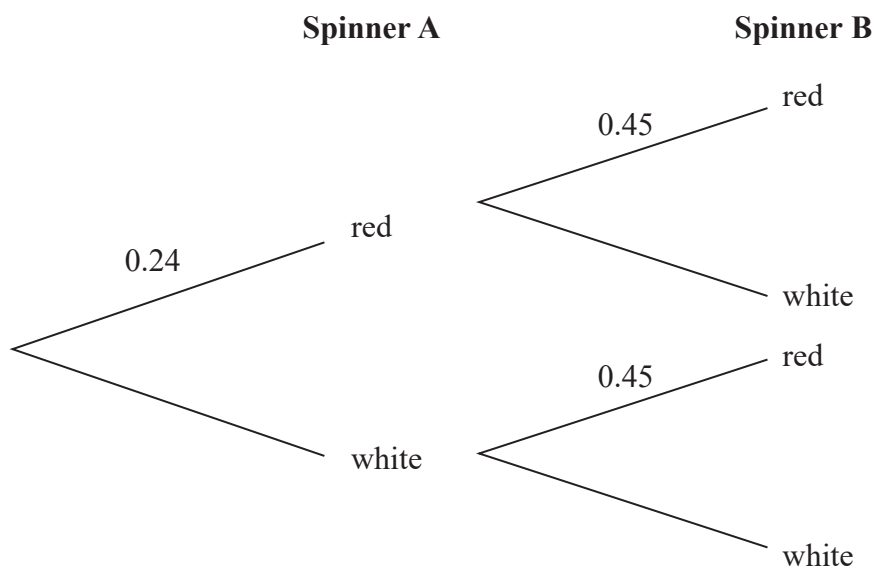
(Total for Question 6 is 4 marks)

- 7 Alan has two spinners, spinner **A** and spinner **B**.
Each spinner can land on only red or white.

The probability that spinner **A** will land on red is 0.24

The probability that spinner **B** will land on red is 0.45

The probability tree diagram shows this information.

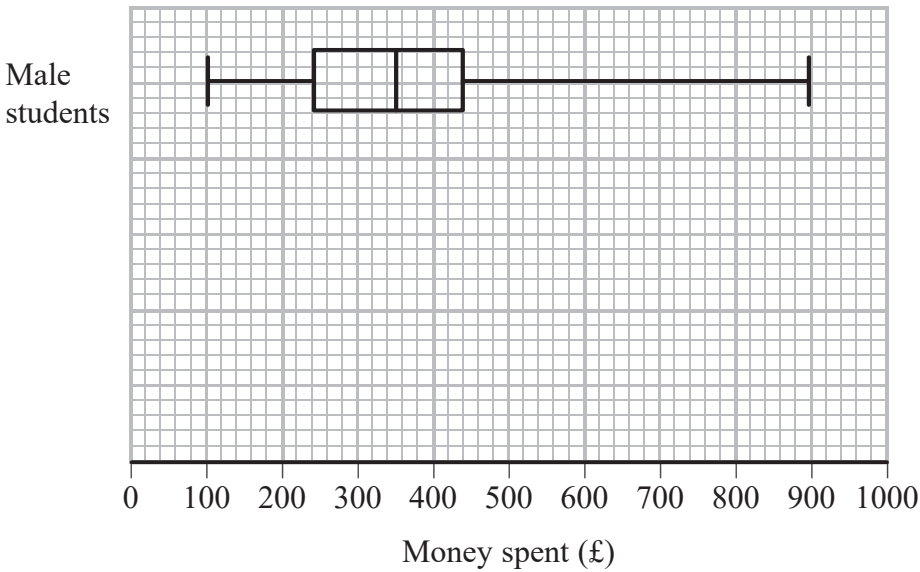


Alan spins spinner **A** once and he spins spinner **B** once.
He does this a number of times.

The number of times **both** spinners land on red is 108

Work out an estimate for the number of times **both** spinners land on white.

- 8 The box plot shows information about the distribution of the amounts of money spent by some male students on their holidays.



- (a) Work out the interquartile range for the amounts of money spent by these male students.

£.....
(2)

The table below shows information about the distribution of the amounts of money spent by some female students on their holidays.

	Smallest	Lower quartile	Median	Upper quartile	Largest
Money spent (£)	80	190	470	550	800

- (b) On the grid above, draw a box plot for the information in the table.

(2)

Chris says,

“The box plots show that the female students spent more money than the male students.”

(c) Is Chris correct?

Give a reason for your answer.

(1)

(Total for Question 8 is 5 marks)

9 Naoby invests £9400 for 6 years.

The investment gets compound interest of $x\%$ per annum.

At the end of 6 years the investment is worth £11757.42

Work out the value of x .

(Total for Question 9 is 3 marks)

10 Jeff is choosing a shrub and a rose tree for his garden.

At the garden centre there are 23 different types of shrubs and some rose trees.

Jeff says,

“There are 322 different ways to choose one shrub and one rose tree.”

Could Jeff be correct?

You must show how you get your answer.

(Total for Question 10 is 2 marks)

11 The points A , B , C and D lie in order on a straight line.

$$AB:BD = 4:9$$

$$AC:CD = 15:7$$

Work out $AB:BC:CD$

..... : :

(Total for Question 11 is 3 marks)