

Monday 11 November 2019 – Afternoon

GCSE (9–1) Mathematics

J560/03 Paper 3 (Foundation Tier)

Time allowed: 1 hour 30 minutes



You may use:

- a scientific or graphical calculator
- geometrical instruments
- tracing paper



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number

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Candidate number

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First name(s)

Last name

INSTRUCTIONS

- Use black ink. You may use an HB pencil for graphs and diagrams.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- If additional space is required, use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

INFORMATION

- The total mark for this paper is **100**.
- The marks for each question are shown in brackets [].
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **24** pages.

Answer **all** the questions.

1 (a) Here are some types of number.

An even
number

An odd
number

A prime
number

A square
number

A cube
number

From the list, write down the type of number being described.

(i) A number that does **not** divide exactly by 2. [1]

(ii) A number that has no factors except itself and 1. [1]

(b) (i) Write down all the multiples of 4 between 21 and 29.

(b)(i) [1]

(ii) Write down a common multiple of 4 and 6.

(ii) [1]

(c) Insert brackets to make this calculation correct.

$$4 - 1 \times 2 = 6 \quad [1]$$

(d) Write 7% as a fraction.

(d) [1]

2 Work out.

$$1.52 \text{ kg} + 80 \text{ g}$$

Give your answer in kilograms.

..... kg [2]

3 (a) Round 32 629 to the nearest thousand.

(a) [1]

(b) Round 32 629 to 1 significant figure.

(b) [1]

4 A circle has radius 5 cm.

(a) Work out the circumference of the circle.

(a) cm [2]

(b) Work out the area of the circle.

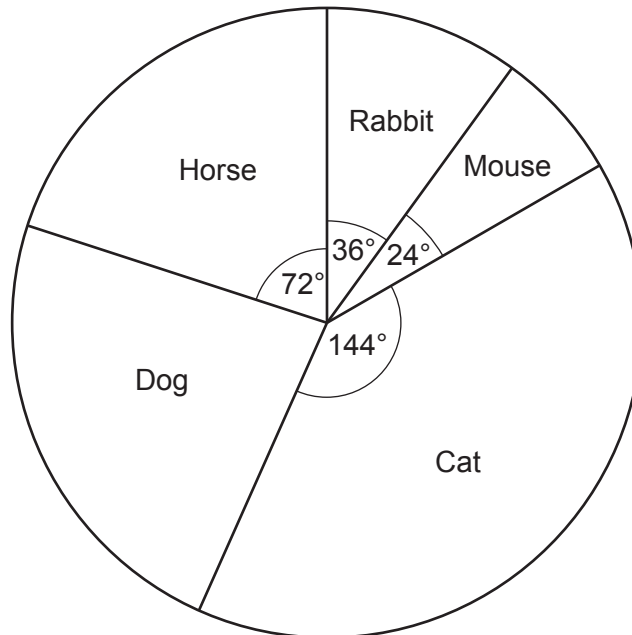
(b) cm^2 [2]

- 5 Dan thinks of a number.
He adds 3 and divides the result by 2.
His answer is 16.

What number is Dan thinking of?

..... [2]

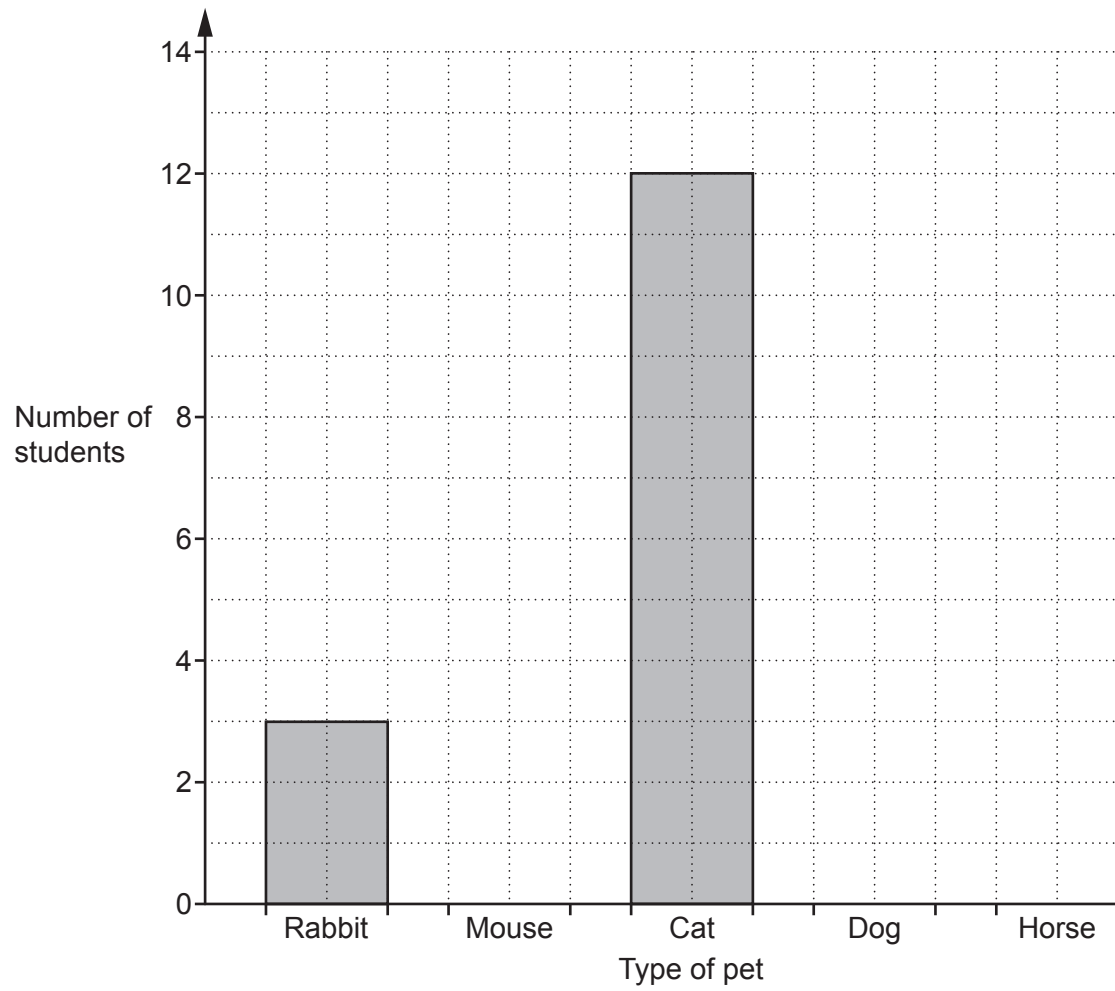
- 6 30 students each own one pet.
The pie chart shows the proportion of each type of pet owned by the 30 students.



- (a) Which type of pet is the mode?

(a) [1]

(b) Use the information in the pie chart to complete this bar chart.



[3]

- 7 Jenny has a five-sided **biased** spinner. The sectors are coloured red, blue, green, yellow and white. She spins the spinner 100 times.

The table shows the number of times the spinner lands on each colour.

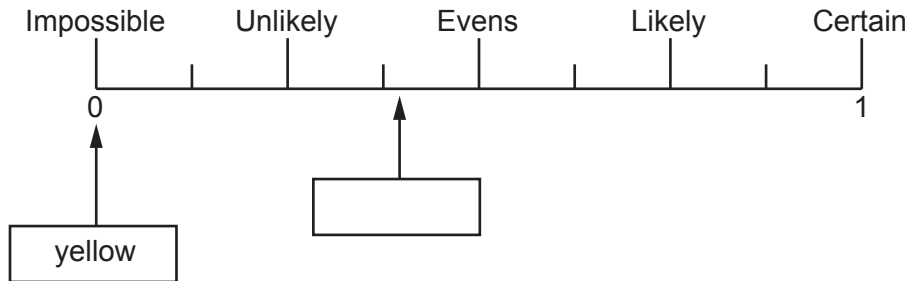
| Colour | Frequency |
|--------|-----------|
| Red | 28 |
| Blue | 38 |
| Green | 6 |
| Yellow | 0 |
| White | 28 |
| Total | 100 |

Jenny uses her data to estimate the probability of the spinner landing on each colour.

- (a) Write down Jenny's estimate for the probability of landing on red.

(a) [1]

- (b) Jenny then writes in some of the colours on this probability scale.



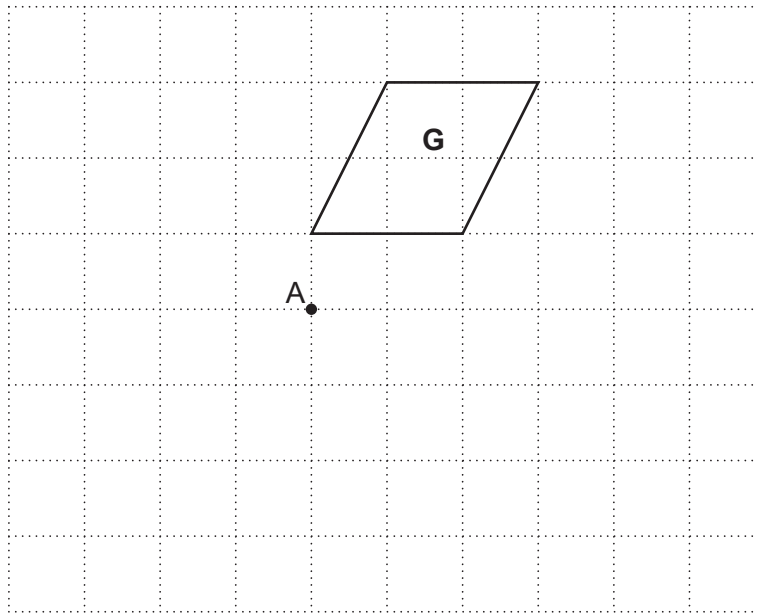
- (i) Write the correct colour in the box. [1]

- (ii) Explain why Jenny's estimate for the probability of landing on yellow cannot be the actual probability.

.....

 [1]

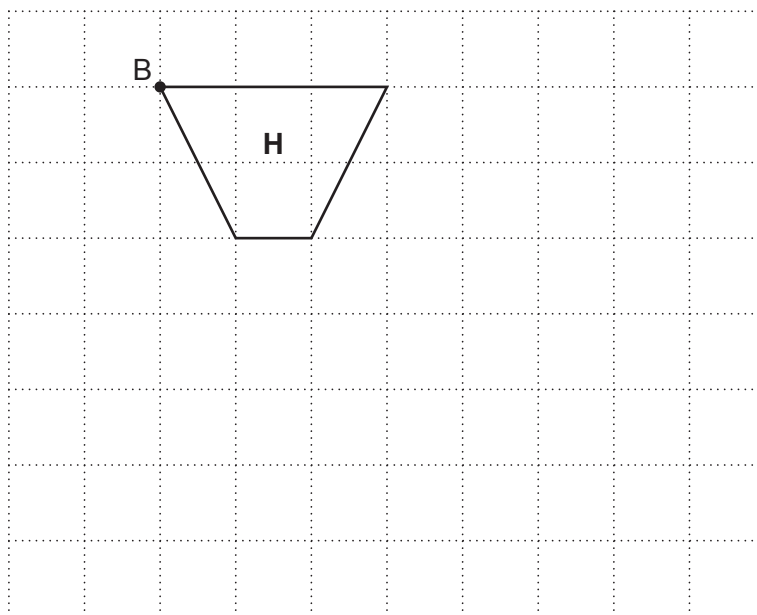
- 8 (a) Shape **G** is drawn on the grid.



Rotate shape **G** by 180° about the point **A**.

[2]

- (b) Shape **H** is drawn on the grid.



Enlarge shape **H** with scale factor 2 and the centre of enlargement at point **B**.

[2]

- 9 Tom buys a radio for £40.
Later he sells it and makes a profit of 20%.

Tom says

The ratio of the price I paid for the radio to the price I sold the radio is 5 : 6.

Show that Tom is correct.

[3]

11 Multiply out.

(a) $3(x - 2)$

(a) [1]

(b) $2a(a + b)$

(b) [2]

12 (a) Find the value of

(i) $\sqrt[3]{216}$,

(a)(i) [1]

(ii) 2^8 .

(ii) [1]

(b) The cube of 3 is added to the square root of 7.

Put a ring around the correct statement.

$\sqrt[3]{3} + 7^2$

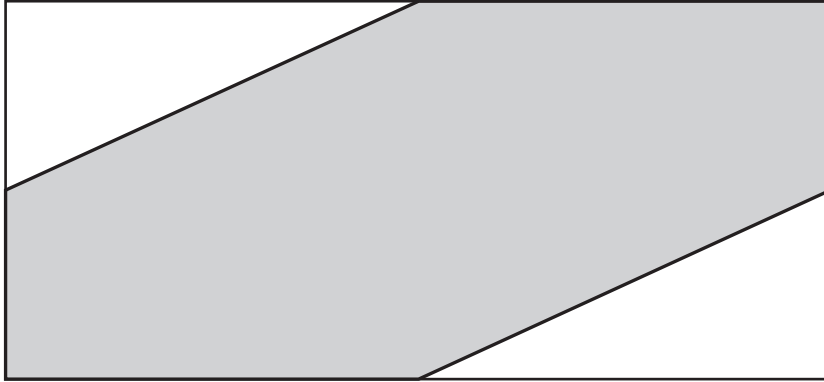
$3^3 + 7^2$

$3^3 + \sqrt{7}$

$\sqrt[3]{3} + \sqrt{7}$

[1]

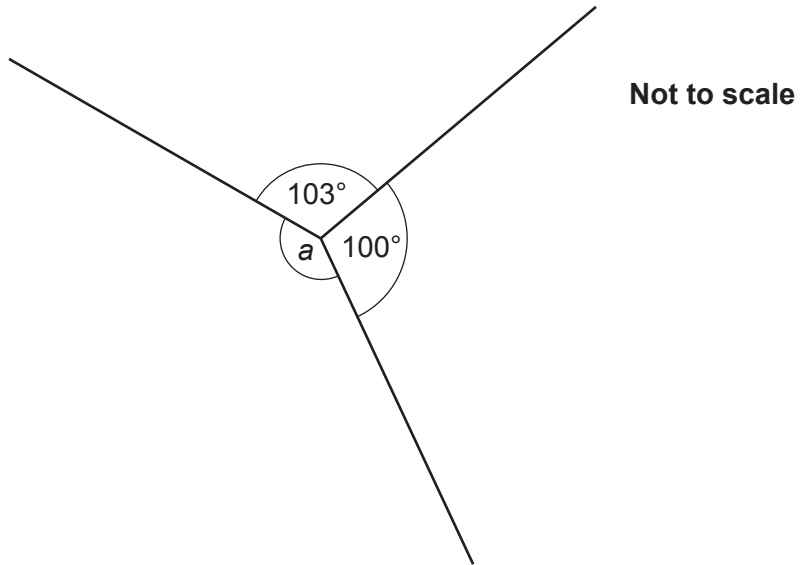
- 13 The midpoints of the sides of a rectangle are joined by straight lines as shown.



Work out the percentage of the rectangle that is shaded.

..... % [4]

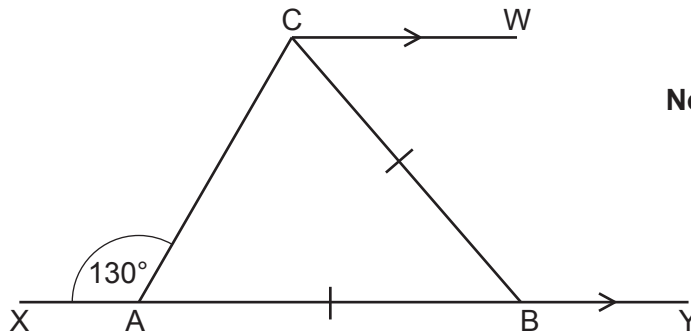
14 (a) Three lines meet at a point.



Work out the size of angle a .

(a) $a = \dots\dots\dots^\circ$ [2]

- (b) XY and CW are parallel lines.
 AB = CB.
 Angle CAX = 130° .



Not to scale

- (i) Complete this sentence.

Angle CAB = 50° because

..... [1]

- (ii) Work out angle BCW.
 Give a reason for each angle you work out.

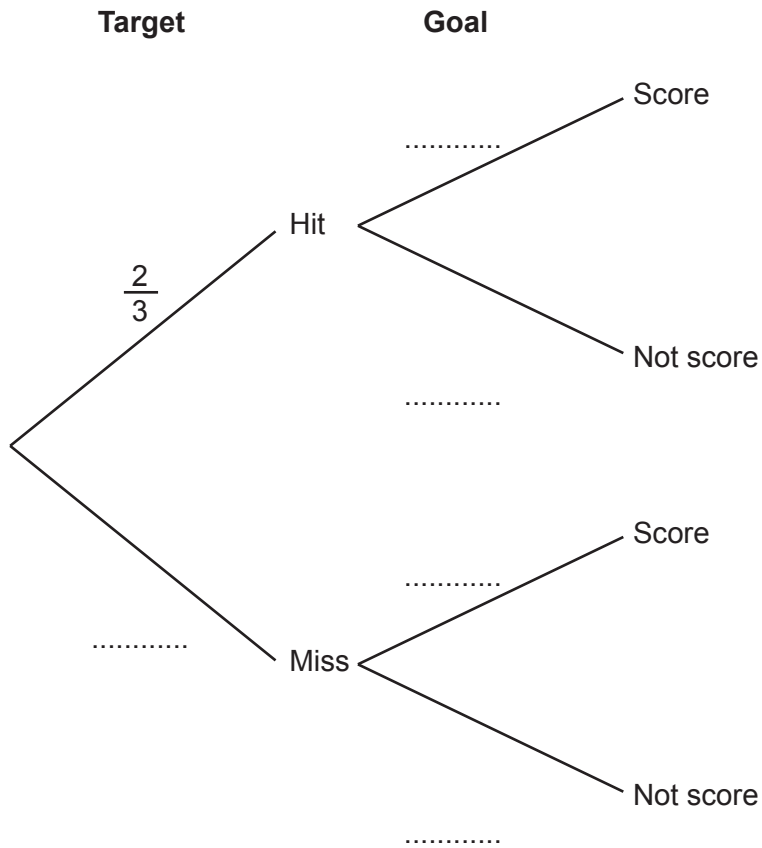
(b)(ii) $^\circ$ [4]

15 Ryan shoots an arrow at a target. He then kicks a ball at a goal.

The probability that Ryan hits the target is $\frac{2}{3}$.

The probability that Ryan scores a goal is $\frac{3}{5}$.

(a) Complete the tree diagram.



[2]

(b) Find the probability that Ryan

(i) misses the target and does not score a goal,

(b)(i) [2]

(ii) either hits the target or scores a goal or both.

(ii) [2]

16 Solve the simultaneous equations.

$$\begin{aligned}2x - y &= 7 \\ 2x + y &= 5\end{aligned}$$

$x = \dots\dots\dots$

$y = \dots\dots\dots$ **[3]**

- 17 Two model cars, **A** and **B**, are in a race.
They start together on the starting line.
Assume each car travels at a constant speed.

Car **A** takes 30 seconds to complete each lap of the track.
Car **B** takes a whole number of seconds to complete each lap of the track.
The two cars next cross the starting line together 150 seconds after the start of the race.

Find the **four** possible times that car **B** could take to complete one lap.

You may find this information helpful.

$$150 = 2 \times 3 \times 5 \times 5$$
$$30 = 2 \times 3 \times 5$$

..... seconds [5]

- 18 (a) Write down the multiplier for an increase of 140%.
Give your answer as a decimal.

(a) [1]

- (b) Ali invests £1500 in October.
The investment increases in value by 10% in November.
It then decreases in value by 20% in December.

Ali says

10% - 20% = -10%, so the £1500 has lost exactly 10% of its value.

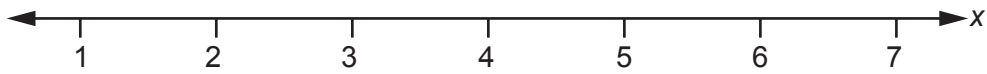
- (i) Explain what Ali has done wrong.

.....
..... [1]

- (ii) Work out the correct percentage loss.

..... % [5]

- 19 Solve $3x - 5 \geq 10$.
Show your solution on the number line.



[4]

- 20 Amrit's income is 32% more than Bethan's income.
Amrit and Bethan's combined income is £54 868.

Calculate Amrit's income.

£ [5]

21 Jacob, Amelie and Reuben each roll a fair six-sided dice.
What is the probability that all three roll a number less than 3?

Give your answer as a fraction in its simplest form.

..... [3]

22 The diagram shows two rectangles, A and B.



Rectangle A has a width of 25 cm and a height of 12 cm.
The width of rectangle B is three times the height of rectangle B.

The area of rectangle A is equal to the area of rectangle B.

Find the perimeter of rectangle B.

..... cm [5]

- 23 Kay invests £1500 in an account paying 3% **compound** interest per year.
Neil invests £1500 in an account paying $r\%$ **simple** interest per year.

At the end of the 5th year, Kay and Neil's accounts both contain the same amount of money.

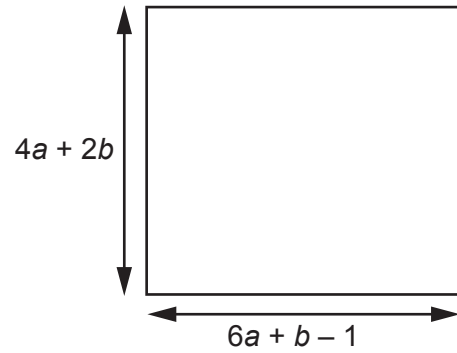
Calculate r .

Give your answer correct to 1 decimal place.

$r = \dots\dots\dots [6]$

24 In this question, all lengths are in centimetres.

Here is a square.



Not to scale

Find the length of one side of the square when $b = 4$.

..... cm [6]

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

A large area of lined paper for writing, consisting of 25 horizontal dotted lines. A solid vertical line runs down the left side of the page, creating a margin. The rest of the page is open for writing.

