OCR
Oxford Cambridge and RSA

Thursday 3 November 2022 – Morning

GCSE (9–1) Mathematics

J560/02 Paper 2 (Foundation Tier)

Time allowed: 1 hour 30 minutes

You must have:
- the Formulae Sheet for Foundation Tier (inside this document)

You can use:
- geometrical instruments
- tracing paper

Do not use:
- a calculator

F

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

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document has **20** pages.

ADVICE
- Read each question carefully before you start your answer.

Answer **all** the questions.

1 The pictogram shows the number of students absent from a school in a particular week.

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

Key:  represents 4 students

$\frac{1}{4}$ of 4 = 1

(a) Harper says

The pictogram shows 2 circles for Monday.
Therefore 2 students were absent on Monday.

Explain what Harper has done wrong.
Write down the correct number of students who were absent on Monday.

Harper has not used the key.

.....

Correct number 8 **[2]**

(b) 5 students were absent on Friday.

Complete the pictogram above to show this information. **[1]**

2 **(a)** Complete each statement by writing the missing power in the box.

(i) $6 \times 6 \times 6 = 6^{\boxed{3}}$ **[1]**

(ii) $16 = 2^{\boxed{4}}$ **[1]**

$2 \times 2 \times 2 \times 2 = 16$

(b) Work out.

$5^2 \times \sqrt{36}$

$5^2 = 25$

$\sqrt{36} = 6$

$$\begin{array}{r} {}^{3}25 \\ \times \quad 6 \\ \hline 150 \end{array}$$

(b) 150 **[3]**

3 Work out.

(a) $0.35 + 6.2$

$$\begin{array}{r} 6.20 \\ +\ 0.35 \\ \hline 6.55 \end{array}$$

(a) 6.55 **[1]**

(b) $4.8 \div 8$

$$8 \overline{)\, 4.^{4}8} \quad 0.6$$

(b) 0.6 **[1]**

4 **(a)** Write $\frac{19}{4}$ as a mixed number.

$4\frac{3}{4}$

(a) $4\frac{3}{4}$ **[1]**

(b) Write $1\frac{7}{9}$ as an improper fraction.

$1 \times 9 + 7 = 16$

$\frac{16}{9}$

(b) $\frac{16}{9}$ **[1]**

(c) Sam says that $\frac{7}{8}$ written as a decimal is 0.78.

Is Sam correct?
Show how you decide.

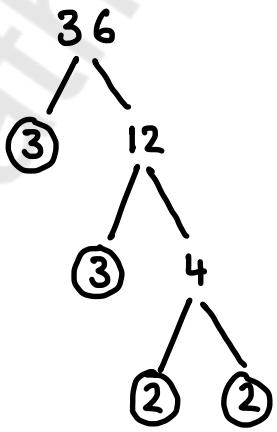
$7 \div 8$

$$8 \overline{)7.70^{6}0^{4}0} \quad 0.875$$

No because $\frac{7}{8}$ is 0.875

[2]

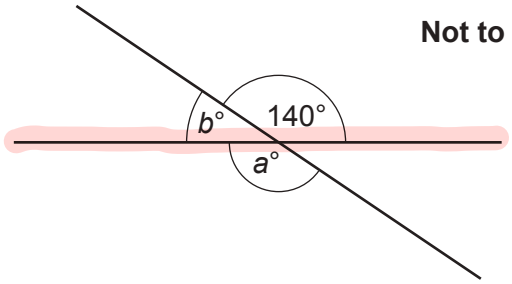
5 Write 36 as a product of prime factors.



$36 = 2 \times 2 \times 3 \times 3$

$2 \times 2 \times 3 \times 3$ **[2]**

6 The diagram shows two intersecting straight lines.



(a) Find the value of a.
Give a reason for your answer.

$a =$ 140 because vertically opposite angles are equal.

..... **[2]**

(b) Find the value of b.
Give a reason for your answer.

180 - 140 = 40

$b =$ 40 because angles on a straight line sum to 180°

..... **[2]**

7 Find the value of $4x + 5y$ when $x = 3$ and $y = -2$.

4(3) + 5(-2)

12 - 10 = 2

2 **[2]**

8 **(a)** Write 65% as a fraction in its simplest form.

$\frac{65}{100} \overset{\div 5}{\underset{\div 5}{}} = \frac{13}{20}$

(a) $\frac{13}{20}$ **[2]**

(b) 25 people entered a competition.
4 of them won a prize.

Work out the percentage of people that won a prize.

$\frac{4}{25} \overset{\times 4}{\underset{\times 4}{}} = \frac{16}{100} = 16\%$

(b) 16 % **[2]**

(c) Increase 250 by 20%.

10% of 250 = 250 ÷ 10 = 25

20% of 250 = 50

250 + 50 = 300

(c) 300 **[3]**

9 **(a)** By writing each number correct to **1** significant figure, find an estimate for 79.8×3.1.

$79.8 \approx 80$

$3.1 \approx 3$

$80 \times 3 = 240$

(a) 240 **[2]**

(b) Jamie works out 79.8×3.1 on a calculator.
Jamie's answer is 2473.8.

Do you think Jamie has used their calculator correctly?
Explain why.

No because 2473.8 is not close to 240.

[1]

10 Ashley has £7 to spend on fruit.
The table shows the prices.

Pineapple (each)	£1.15
Bananas (for 1 kilogram)	70p
Strawberries (for a 200 g pack)	£1.30

Ashley buys 2 pineapples and 3 kilograms of bananas.
Ashley spends the remaining money on strawberries.

Work out the **mass, in grams**, of strawberries that Ashley buys.
You must show your working.

Pineapple

2 x £1.15 = £2.30

3 kg bananas

3 x 70p = 210p = £2.10

Spent

$$\begin{array}{r} 2.30 \\ +\ 2.10 \\ \hline 4.40 \end{array}$$

Remaining

$$\begin{array}{r} {}^{6}\not{7}.{}^{1}0\,0 \\ -\ 4.40 \\ \hline £2.60 \end{array}$$

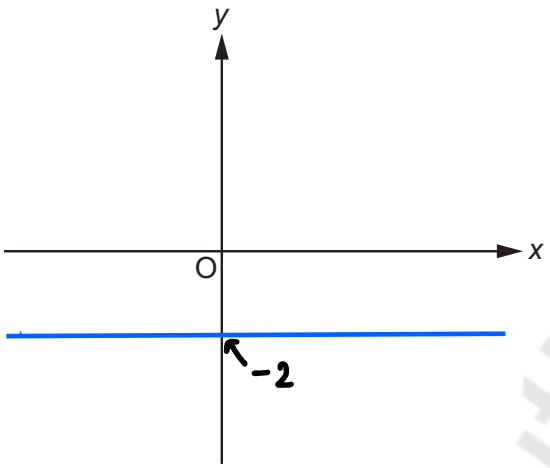
Strawberries

£2.60 ÷ £1.30 = 2

2 x 200g = 400g

..... 400 ..... g **[6]**

11 **(a)** Sketch the graph of $y = -2$.
Show clearly the value of any intercepts.



[2]

(b) Sketch the graph of $y = x - 3$.
Show clearly the value of any intercepts.

$y = x - 3$

$y = mx + c$

$m = 1$

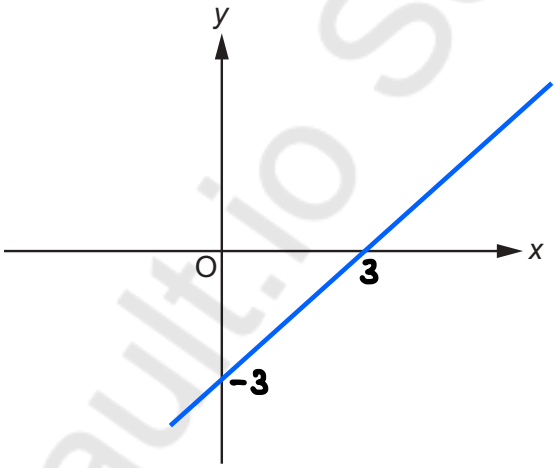
$c = -3$

$(0, -3)$

$0 = x - 3$

$+3 \quad +3$

$x = 3 \qquad (3, 0)$

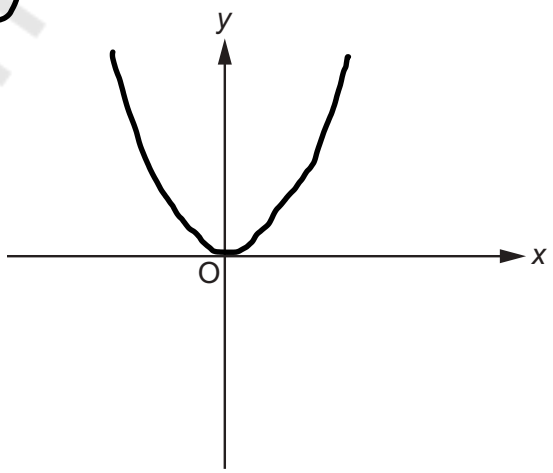


[3]

(c) Sketch the graph of $y = x^2$.

Quadratic ∪

$(0, 0)$



[1]

12 Multiply out.

(a) $3(x+1)$

$3x + 3$

(a) ..... $3x + 3$ ..... **[1]**

(b) $3d(d-2)$

$3d^2 - 6d$

(b) ..... $3d^2 - 6d$ ..... **[2]**

13 Work out.

(a) $\frac{3}{7} \times 2$

$\frac{3}{7} \times \frac{2}{1} = \frac{6}{7}$

(a) ..... $\frac{6}{7}$ ..... **[1]**

(b) $\frac{2}{3} - \frac{1}{4}$

$\frac{2}{3}^{\times 4} - \frac{1}{4}^{\times 3}$

$\frac{8}{12} - \frac{3}{12} = \frac{5}{12}$

(b) ..... $\frac{5}{12}$ ..... **[2]**

14 Solve.

$6x - 9 = 27 - 4x$

$+4x \qquad +4x$

$10x - 9 = 27$

$+9 \quad +9$

$10x = 36$

$\div 10 \qquad \div 10$

$x = \frac{36}{10} = 3.6$

$x =$ 3.6 **[3]**

15 Kai invests £600 at a simple interest rate of r% each year.
After 5 years, Kai's investment is worth £690.

Find the value of r.

£690 − £600 = £90 interest

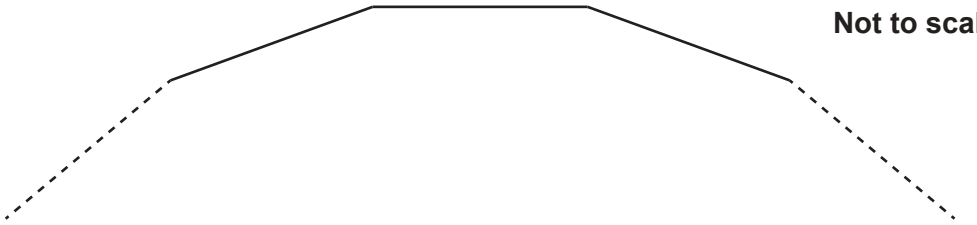
£90 ÷ 5 = £18 each year

$\frac{18}{600} \overset{\div 6}{=} \frac{3}{100} = 3\%$ (÷6)

$r = 3$

$r =$ 3 **[4]**

16 The diagram shows part of a regular 12-sided polygon.



Not to scale

For this polygon, find the ratio of the size of one exterior angle to the size of one interior angle.
Give your answer in its simplest form.
You must show your working.

Exterior angle $\frac{360}{n}$

$\frac{360}{12} = 30°$

Interior angle int. + ext. = 180

$180 - 30 = 150°$

Exterior : Interior

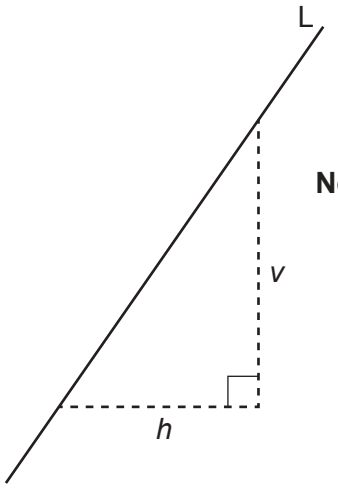
30 : 150

$\div 30$ $\div 30$

1 : 5

1 : 5 **[5]**

17 A straight line, L, is shown below.



(a) Write down the ratio $v : h$ when the gradient of line L is 4.

$\frac{v}{h} = 4$ $\frac{4}{1} = 4$ v : h, 4 : 1

(a) 4 : 1 **[1]**

(b) Find the gradient of line L as a fraction in its simplest form when $v : h = 14 : 6$.

$m = \frac{v}{h}$

$= \frac{14}{6}$ ÷2 ÷2

$= \frac{7}{3}$

(b) $\frac{7}{3}$ **[2]**

18 Find all the possible integer values that satisfy the inequality $4 \leqslant 2x < 10$.

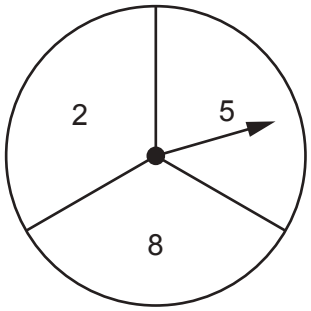
÷2 ÷2 ÷2

$2 \leqslant x < 5$

2, 3, 4

2, 3, 4 **[3]**

19 Azmi has a fair spinner numbered 2, 5 and 8.



Azmi spins the spinner twice and adds the two scores to get a total.

(a) Complete the table to show all of the possible totals.

		First spin		
	Total	2	5	8
Second spin	2	4	7	10
	5	7	10	13
	8	10	13	16

[1]

(b) Find the probability that the total is a square number.

1 4 9 16 25 ...

$\frac{2}{9}$

(b) $\frac{2}{9}$ ..... **[2]**

20 Layla and Jamal open a box of sweets.
Layla and Jamal share all of the sweets in the ratio 2 : 3.
2 → 5 parts

(a) Write down the fraction of the sweets that Layla receives.

(a) $\frac{2}{5}$ **[1]**

(b) Layla eats some of **her** sweets.
She is then left with 18% of the sweets that were in the box.

Work out the percentage of **her** sweets that Layla has eaten.

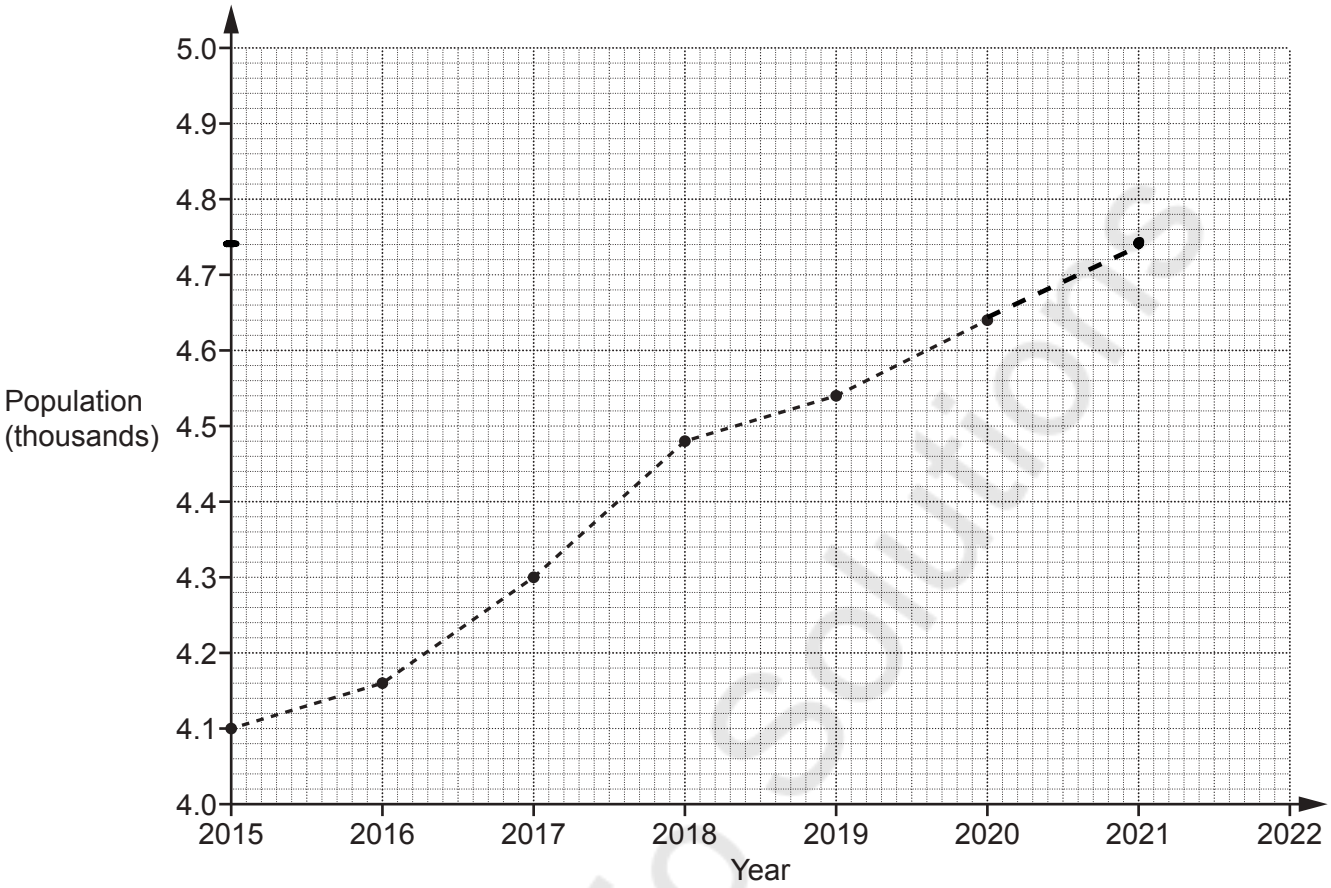
Layla $\frac{2}{5} \overset{\times 20}{=} \frac{40}{100} = 40\%$

$40\% - 18\% = 22\%$

$\frac{22}{40} \overset{\div 2}{=} \frac{11}{20} \overset{\times 5}{=} \frac{55}{100} = 55\%$

(b) 55 % **[4]**

21 The graph shows information about the population of a village.



(a) The population of the village in 2021 was 4740.
Plot this point on the graph. ↳ ÷1000 = 4.74 **[1]**

(b) Work out the increase in the population of the village between 2016 and 2018.

2016 = 4.16

2018 = 4.48

4.48
- 4.16
0.32

0.32 × 1000 = 320

(b) 320 **[2]**

(c) Rowan says that there was a huge increase in the population of the village between 2015 and 2020.

Describe how Rowan may have been misled by the graph.

Only part of the vertical scale is shown.

[1]

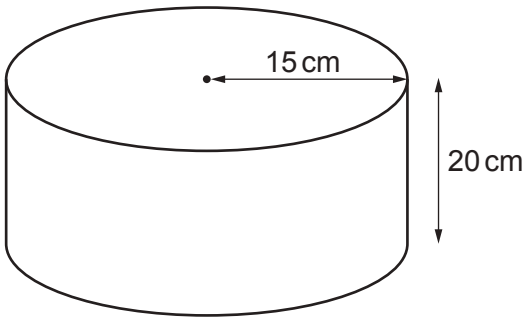
(d) Blake says that the population of the village will be greater than 4800 in 2022.

Write down an assumption Blake has made.

Increasing trend continues.

[1]

22 The diagram shows a cylinder with radius 15 cm and height 20 cm.



Not to scale

Front elevation

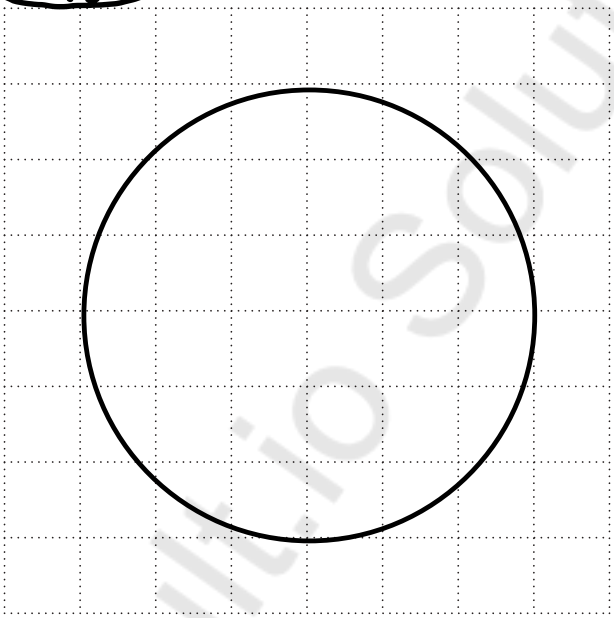
(a) On the grid below, draw the plan view of the cylinder.
Use the scale 1 cm represents 5 cm.

÷5

r = 15

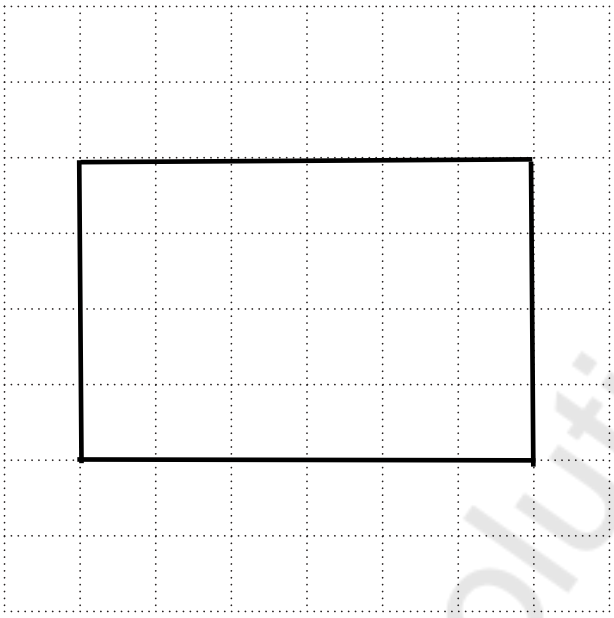
d = 30

30 ÷ 5 = 6 cm



[2]

(b) On the grid below, draw the front elevation of the cylinder.
Use the scale 1 cm represents 5 cm.



[2]

23 A student says that they have placed the following values in order starting with the smallest.

$\left(\frac{1}{10}\right)^2$ $\sqrt{0.25}$ 4^{-1}

Has the student done this correctly?
Show how you decide.

$\left(\frac{1}{10}\right)^2 = \frac{1}{100} = 0.01$ (1)

$\sqrt{0.25} = 0.5$ (3)

$4^{-1} = \frac{1}{4} = 0.25$ (2)

No because 4^{-1} is greater than $\sqrt{0.25}$

[4]

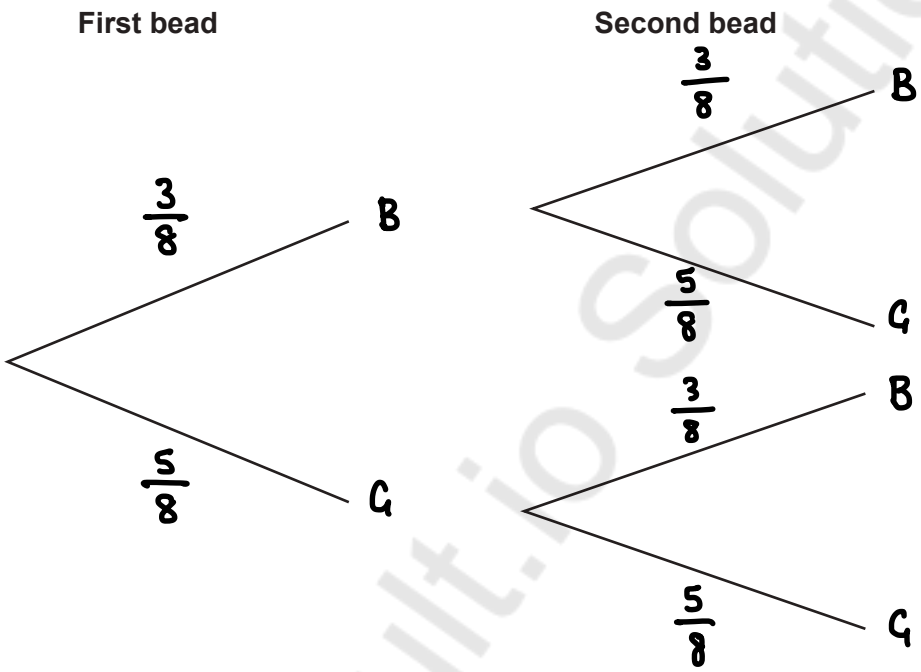
24 Alex has a bag containing 3 blue beads and 5 green beads.
There are no other beads in the bag.

Alex takes a bead at random from the bag, puts it back, and then takes another bead.

Alex says

The probability that the two beads are the same colour is less than 50%.

Is Alex correct?
Show how you decide.
You may use this tree diagram if you wish.



$p(BB) + p(GG)$

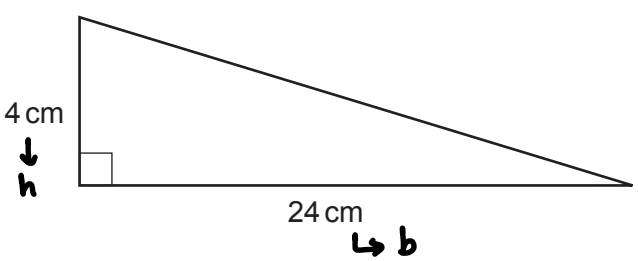
$\left(\frac{3}{8} \times \frac{3}{8}\right) + \left(\frac{5}{8} \times \frac{5}{8}\right)$

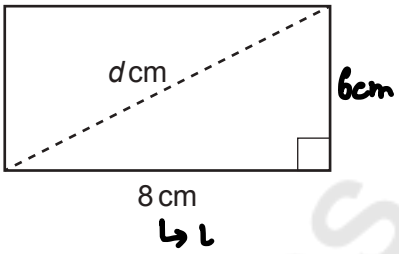
$\frac{9}{64} + \frac{25}{64} = \frac{34}{64}$

No because $\frac{34}{64}$ is greater than 50%.

..... **[5]**

25 The diagram shows a right-angled triangle and a rectangle.





Not to scale

The triangle and rectangle have the same area.

Calculate the length, d cm, of the diagonal of the rectangle.
You must show your working.

Area $= \frac{1}{2}bh$

$= \frac{1}{2} \times 24 \times 4$

$= 12 \times 4$

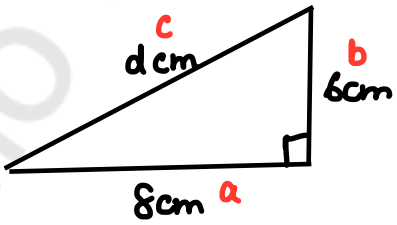
$= 48 \text{ cm}^2$

Area $= l \times w$

$48 = 8 \times w$

$w = 48 \div 8$

$= 6 \text{ cm}$



$a^2 + b^2 = c^2$

$8^2 + 6^2 = c^2$

$64 + 36 = c^2$

$100 = c^2$

$\sqrt{\quad} \quad \sqrt{\quad}$

$10 = c$

$d = 10$

$d =$ 10 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).