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CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/33

Paper 3 (Core)

May/June 2022

1 hour 45 minutes

You must answer on the question paper.

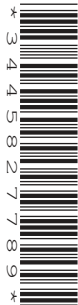
You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π , use your calculator value.

INFORMATION

- The total mark for this paper is 96.
- The number of marks for each question or part question is shown in brackets [].

This document has **20** pages. Any blank pages are indicated.

Formula List

Area, A , of triangle, base b , height h .

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

Area, A , of circle, radius r .

$$A = \pi r^2$$

Circumference, C , of circle, radius r .

$$C = 2\pi r$$

Curved surface area, A , of cylinder of radius r , height h .

$$A = 2\pi rh$$

Curved surface area, A , of cone of radius r , sloping edge l .

$$A = \pi rl$$

Curved surface area, A , of sphere of radius r .

$$A = 4\pi r^2$$

Volume, V , of prism, cross-sectional area A , length l .

$$V = Al$$

Volume, V , of pyramid, base area A , height h .

$$V = \frac{1}{3}Ah$$

Volume, V , of cylinder of radius r , height h .

$$V = \pi r^2 h$$

Volume, V , of cone of radius r , height h .

$$V = \frac{1}{3}\pi r^2 h$$

Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$

3Answer **all** the questions.

- 1 (a)** Write sixteen thousand and twenty-four in numbers.

..... [1]

- (b)** Write $8\frac{2}{5}$ as a decimal.

..... [1]

- (c)** Write down the square number between 10 and 20.

..... [1]

- (d)** Work out $\frac{3.2}{2.6 + 5.8}$.

Give your answer correct to 5 significant figures.

..... [2]

- (e)** Find the value of 4.23^4 .
Give your answer correct to 1 decimal place.

..... [2]

- (f)** Kelly buys candy bars that cost \$0.72 each.
He buys the greatest number of candy bars he can with \$8.

- (i)** Work out the number of candy bars that he buys.

..... [2]

- (ii)** Work out how much change he receives.

\$ [1]

4

- 2 The table shows the type of doughnut and the number of doughnuts sold in a shop on one day.

Type	Sugar	Raisin	Cream	Jam	Iced
Number	2000	2500	1500	1250	750

- (a) Find the total number of doughnuts sold.

..... [1]

- (b) Write down the most popular type of doughnut.

..... [1]

- (c) Work out how many more jam doughnuts were sold than iced doughnuts.

..... [1]

- (d) Work out the fraction of the doughnuts sold that were jam doughnuts.
Give your answer as a fraction in its simplest form.

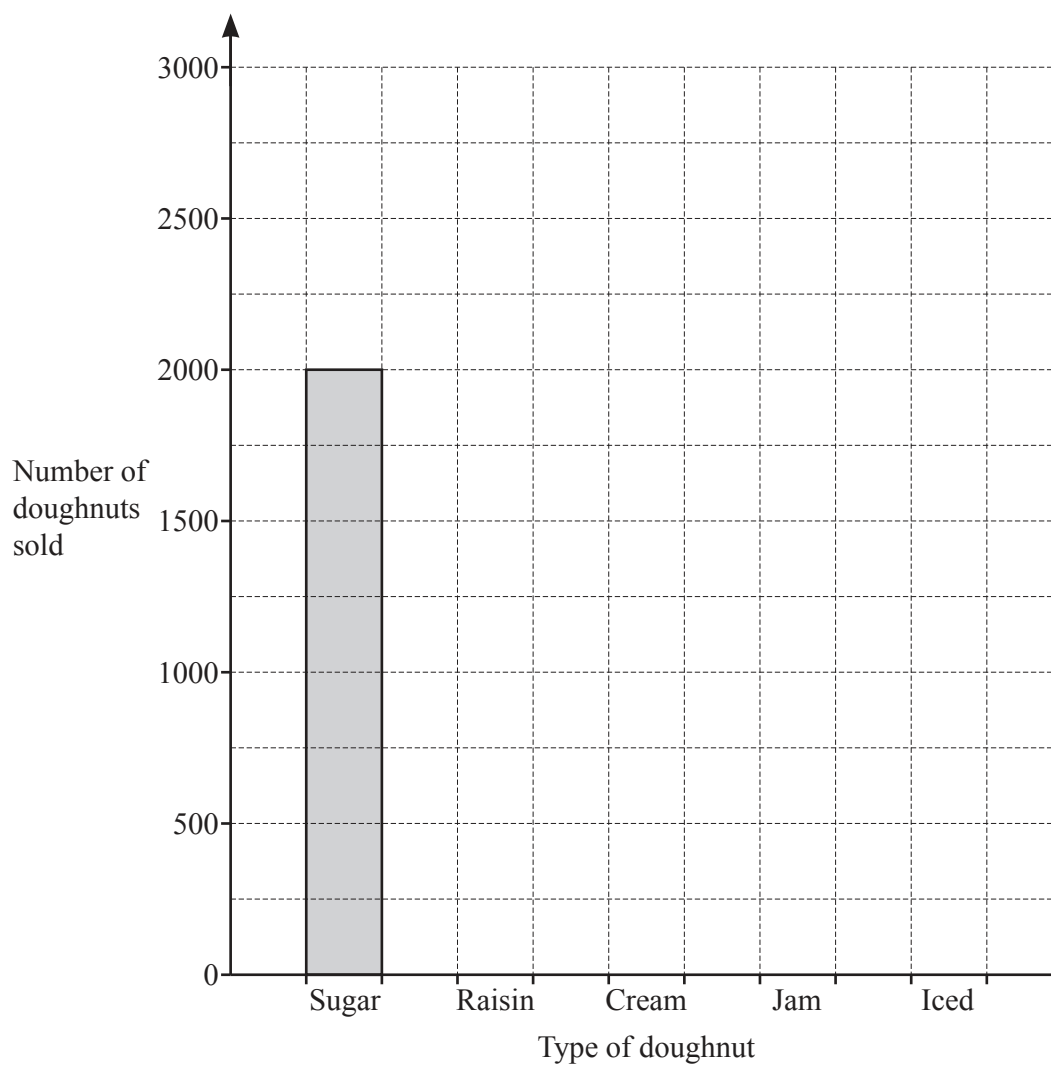
..... [2]

- (e) Write the ratio 1500 : 1250 : 750 in its simplest form.

..... : : [2]

5

(f) On the grid below, complete the bar chart to show the information in the table.

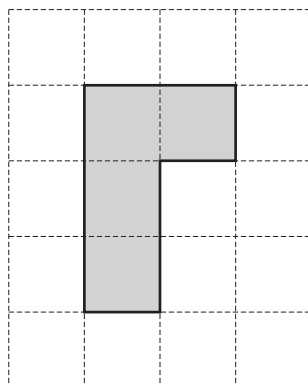


[2]

- (g) Sugar doughnuts cost \$1.25 each.
Raisin doughnuts cost \$1.50 each.

Work out the total cost of 5 sugar doughnuts and 3 raisin doughnuts.

\$ [2]

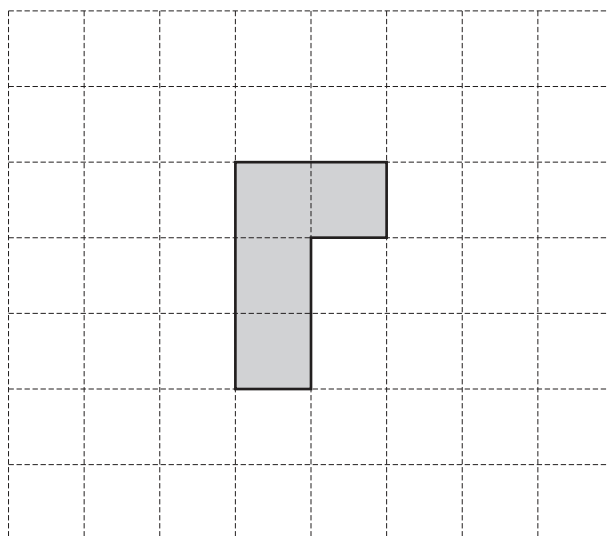
6**3 (a)**

This shape is drawn on a 1 cm^2 grid.

Work out the perimeter and the area of the shape.
Give the units of each answer.

Perimeter [3]

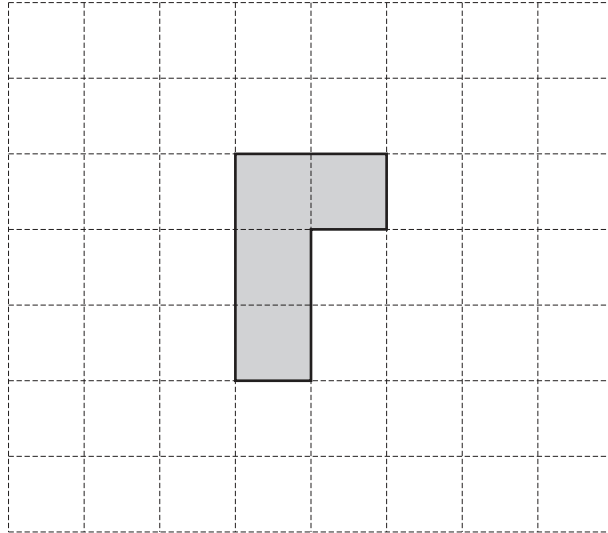
Area [3]

(b)

Add one more square to the shape above so that the shape has rotational symmetry of order 2. [1]

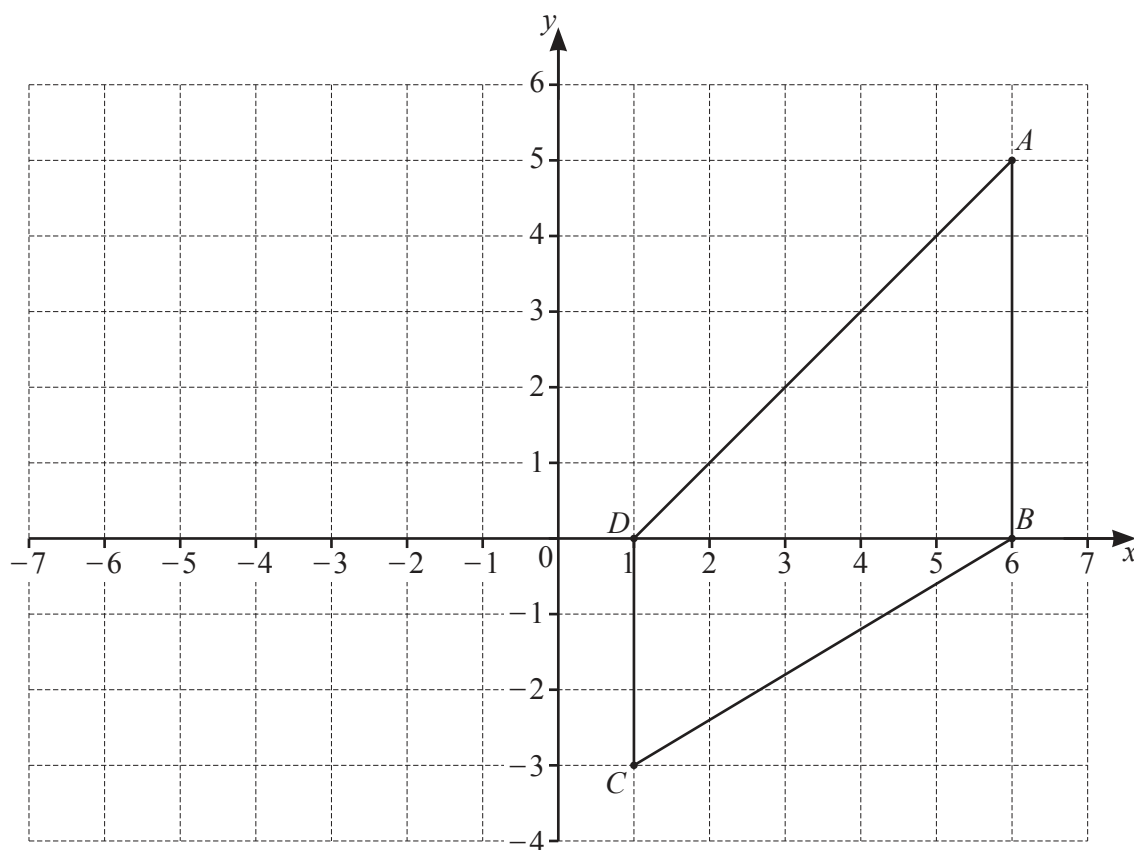
7

(c)



- (i) Add one more square to the shape above so that the shape has line symmetry. [1]
- (ii) On your shape, draw the line of symmetry. [1]

4



The diagram shows quadrilateral $ABCD$ drawn on a 1 cm^2 grid.

(a) Write down the coordinates of points A , B and C .

A (.....,)

B (.....,)

C (.....,) [3]

(b) Write down the mathematical name of

(i) quadrilateral $ABCD$,

..... [1]

(ii) triangle BCD .

..... [1]

9

- (c) Use Pythagoras' Theorem to calculate the length of AD .

$AD = \dots\dots\dots$ cm [2]

- (d) Use trigonometry to calculate angle DCB .

Angle $DCB = \dots\dots\dots$ [2]

- (e) Reflect quadrilateral $ABCD$ in the y -axis. [1]

10

5 To hire a van, a company charges \$2.50 for each kilometre travelled plus a fixed charge of \$800.

(a) The total cost is T dollars when the distance travelled is k kilometres.

Write an equation for T in terms of k .

..... [2]

(b) Kiera hires a van and travels 324 kilometres.

Find the total amount she has to pay.

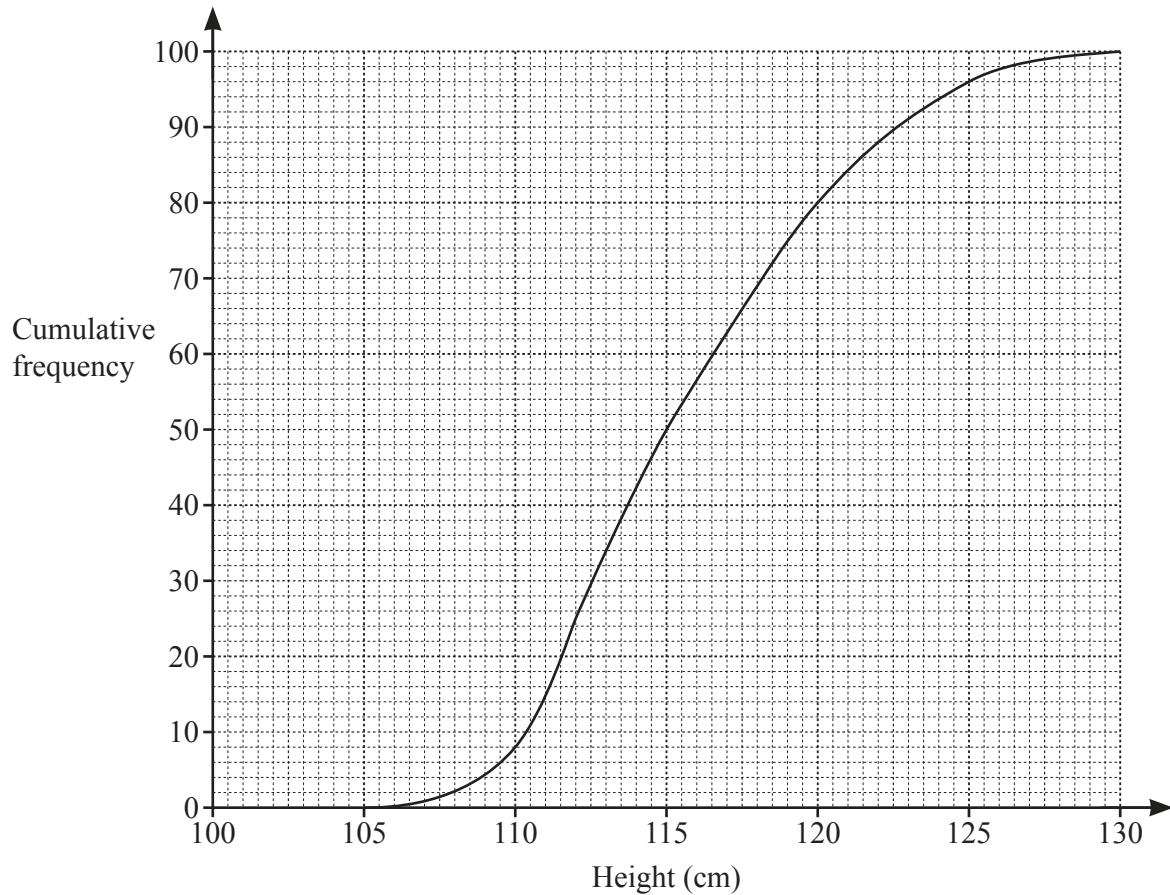
\$ [2]

(c) Misty hires a van and pays \$1045.

Find how many kilometres she travels.

..... km [2]

- 6 The cumulative frequency curve shows the heights, in cm, of 100 adult Emperor penguins.



Use the curve to estimate

- (a) the median,

..... cm [1]

- (b) the lower quartile,

..... cm [1]

- (c) the interquartile range,

..... cm [1]

- (d) the number of Emperor penguins that have a height of 120 cm or more.

..... [2]

12

7 Greta joins a gym for one year.

(a) She can pay her membership every week, every month or in one payment for the whole year.

Payment type	Cost
Weekly	\$5.95
Monthly	\$25.00
Yearly	\$297.75

Work out which payment type is the cheapest.
Show all your working.

..... [3]

(b) On the cycle machine, Greta cycles a distance of 3.2 km in 10 minutes.

Work out her average speed in km/h.

..... km/h [2]

(c) On the treadmill, Greta walks at 6.3 km/h.

(i) Work out the distance she walks in 27 minutes.
Give your answer in kilometres.

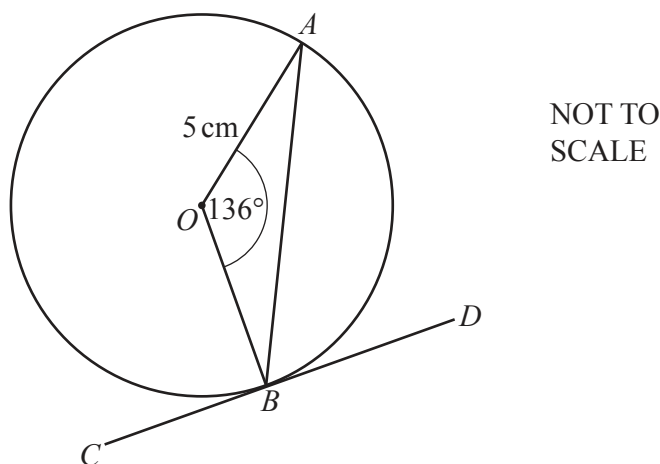
..... km [2]

(ii) Change 6.3 km/h to m/min.

..... m/min [2]

13

8



The diagram shows a circle, centre O , radius 5 cm.
Angle $AOB = 136^\circ$ and CBD is a tangent to the circle at B .

(a) Find the size of

(i) angle OBC ,

Angle $OBC = \dots\dots\dots$ [1]

(ii) angle OAB ,

Angle $OAB = \dots\dots\dots$ [2]

(iii) angle ABD .

Angle $ABD = \dots\dots\dots$ [1]

(b) Show that the area of the minor sector AOB is 29.7 cm^2 , correct to 1 decimal place.

[2]

(c) Work out the length of the minor arc AB .

$\dots\dots\dots$ cm [2]

14**9 (a)** Solve.

(i) $6x = 42$

$x = \dots\dots\dots$ [1]

(ii) $2x - 4 = 2$

$x = \dots\dots\dots$ [2]

(b) Factorise completely.

$7b^2 - 14b$

$\dots\dots\dots$ [2]

(c) Expand.

$4(2a - 5)$

$\dots\dots\dots$ [2]

(d) Solve the simultaneous equations.
Show all your working.

$5a - 2b = 12$

$6a + b = 11$

$a = \dots\dots\dots$

$b = \dots\dots\dots$ [3]

15**(e)** Find the value of x in each of the following.

(i) $\frac{a^6}{a^2} = a^x$

$x = \dots\dots\dots [1]$

(ii) $a^3 \times a^x = a^{15}$

$x = \dots\dots\dots [1]$

(f) Write as a single fraction in its simplest form.

(i) $\frac{x}{3} + \frac{2x}{5}$

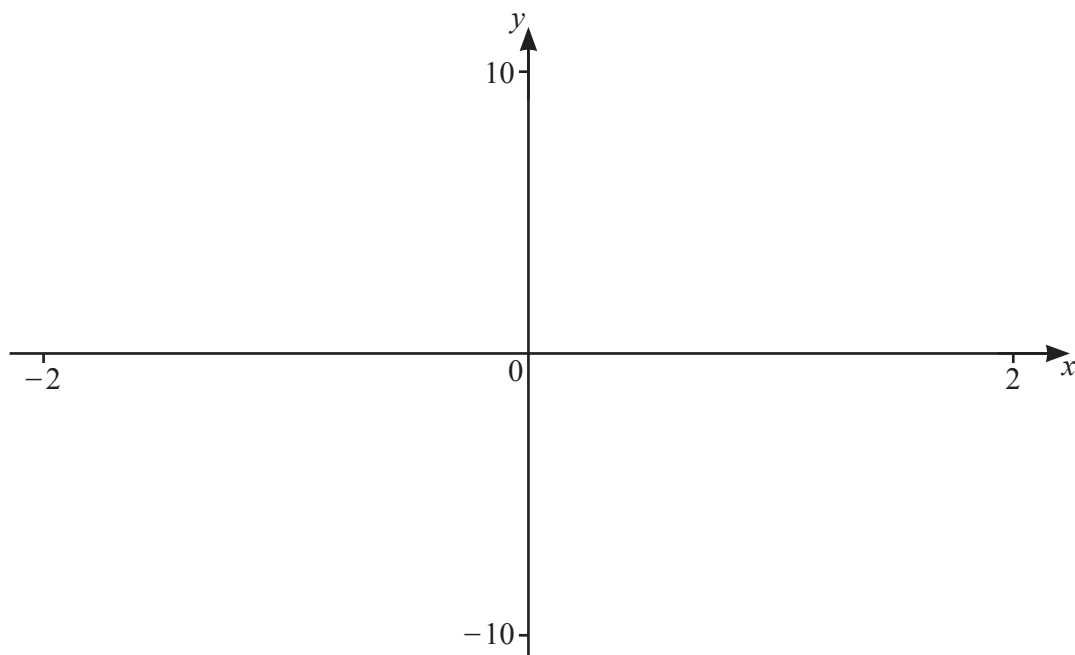
$\dots\dots\dots [2]$

(ii) $\frac{mn^2}{5} \div \frac{m^2n}{15}$

$\dots\dots\dots [3]$

16

10



(a) On the diagram, sketch the graph of $y = x^3 + \frac{1}{x}$ for values of x between -2 and 2 . [2]

(b) Write down the equation of the vertical asymptote.

..... [1]

(c) Find the coordinates of the local minimum.

(.....,) [2]

(d) On the same diagram, sketch the graph of $y = 5x$ for $-2 \leq x \leq 2$. [2]

(e) Solve the equation $x^3 + \frac{1}{x} = 5x$ for values of x between -2 and 2 .

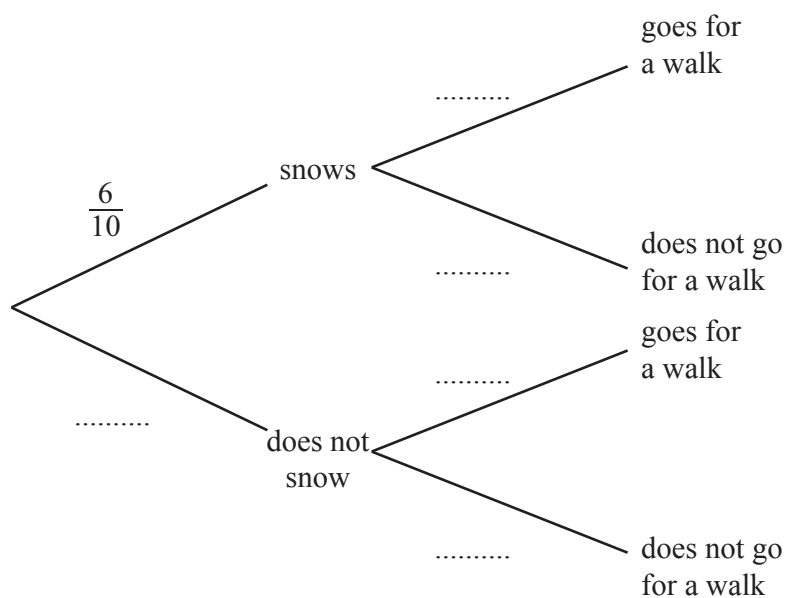
..... and [2]

- 11** The probability that it snows on any day in February is $\frac{6}{10}$.

If it snows, the probability that Maud goes for a walk is $\frac{2}{5}$.

If it does not snow, the probability that Maud goes for a walk is $\frac{5}{7}$.

- (a)** Complete the tree diagram to show this information.



[3]

- (b)** One day in February is chosen at random.

Find the probability that it snows and Maud does not go for a walk.

$\dots\dots\dots$ [2]

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