Name: _____

Maths Genie Stage 13

Test D

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- **Calculators may be used.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1   There are only red marbles and green marbles in a bag.
There are 7 red marbles and 8 green marbles.

Mason takes at random a marble from the bag.
He does not put the marble back in the bag.

Mason takes at random a second marble from the bag.

(a) Complete the probability tree diagram.

1ˢᵗ marble   **2ⁿᵈ marble**

Red .... Red

Red

.... Green

.... Red

Green

.... Green
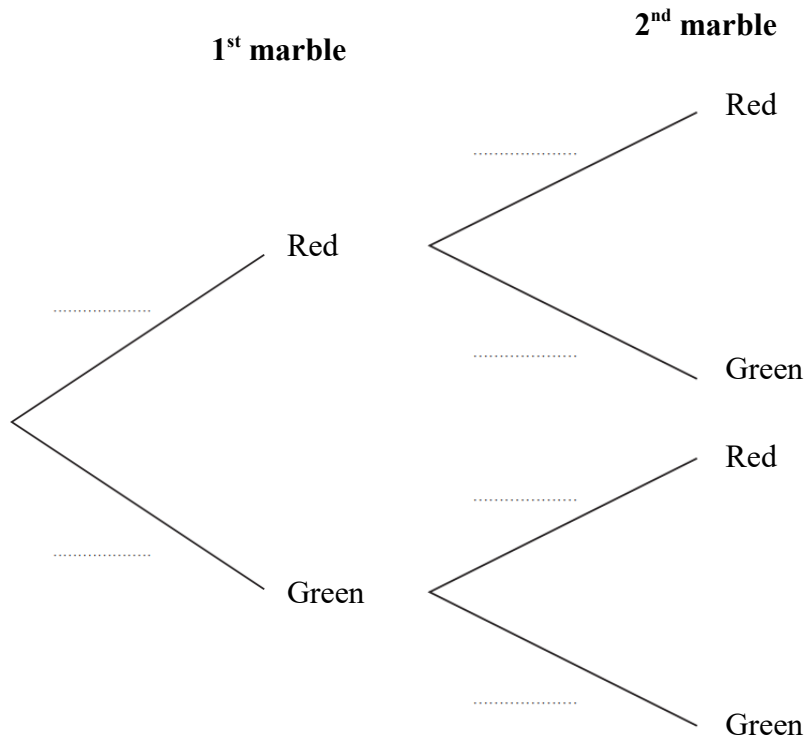
(2)

(b) Work out the probability that Mason takes two marbles the same colour.

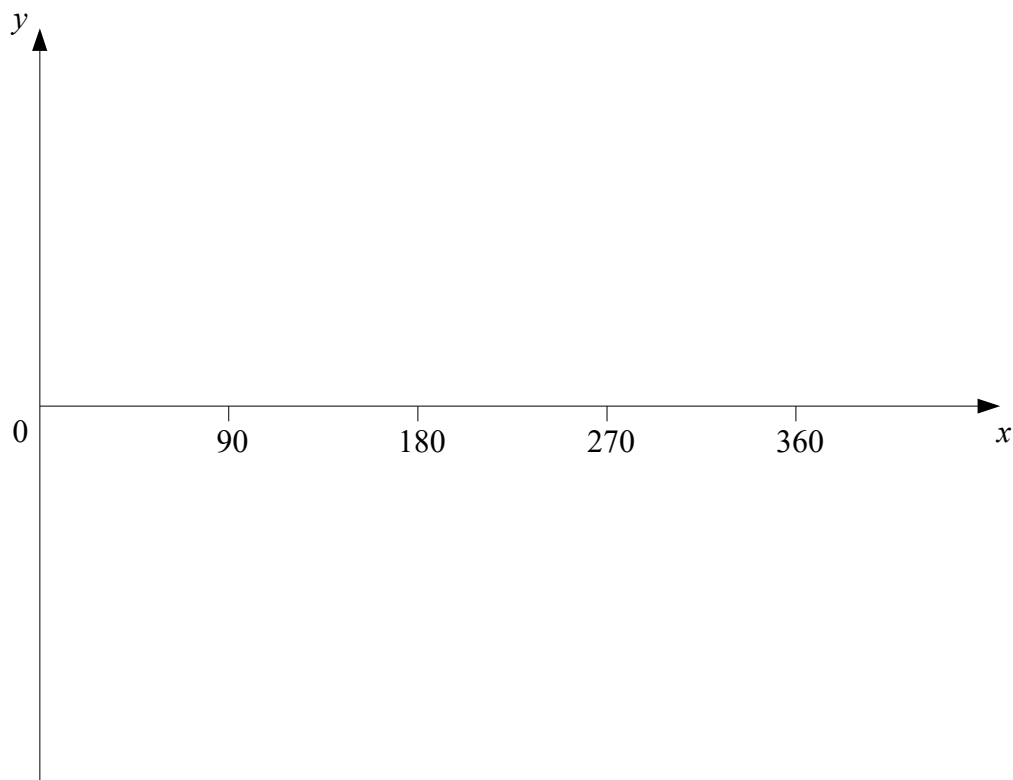...
(2)

(Total for Question 1 is 4 marks)

2 By completing the square, find the coordinates of the turning point of the curve with the equation $y = x^2 + 8x - 3$

You must show all your working.

…..........................

(Total for Question 2 is 3 marks)

3 Sketch the graph of $y = \tan x°$ for $0 \leq x \leq 360$

(Total for Question 3 is 2 marks)

4

$$v = \frac{s}{t}$$

$s = 6.27$ correct to 2 decimal places
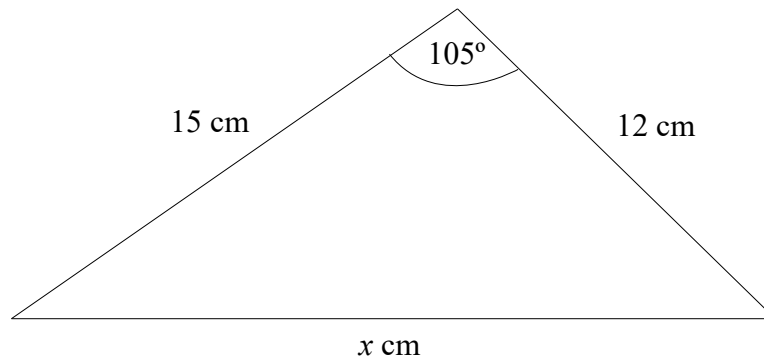$t = 3.914$ correct to 3 decimal places

Work out the upper bound for v.
Give your answer to 3 decimal places.

....

(Total for Question 4 is 3 marks)

5 Solve $\dfrac{4}{x-2} + \dfrac{2}{x-5} = 3$

....

(Total for Question 5 is 4 marks)

6

Work out the value of *x*.
Give your answer to 1 decimal place.

…..........................

(Total for Question 6 is 3 marks)

7   Prove that the difference between the squares of any 2 consecutive integers is equal to the sum of these integers.

(Total for Question 7 is 3 marks)
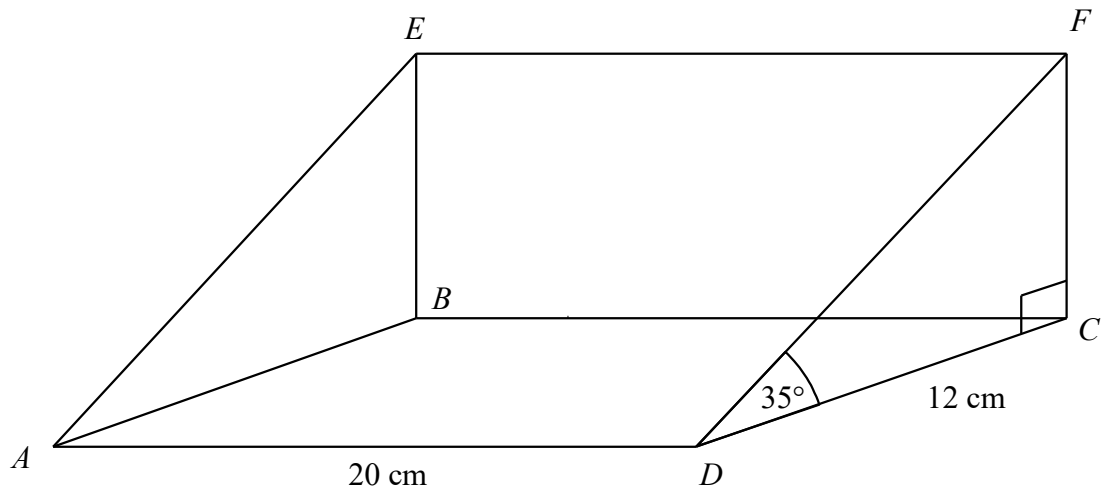
8
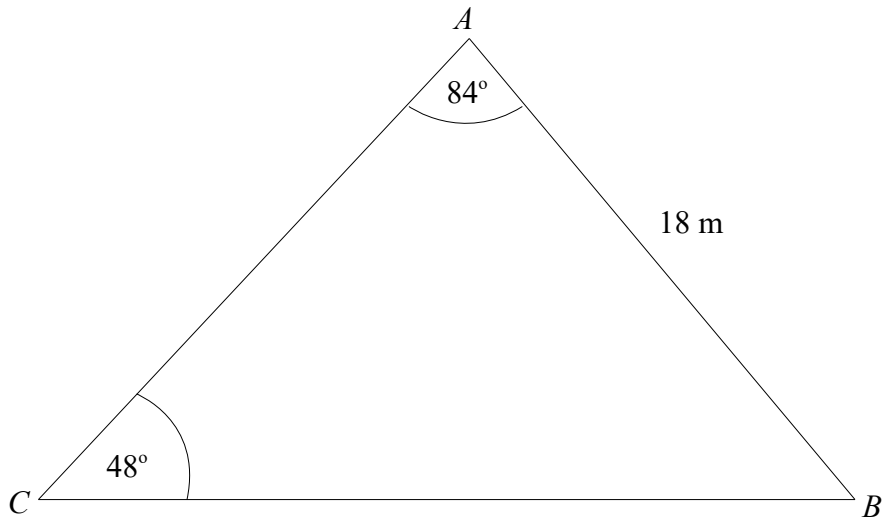
Work out the area of triangle *ABC*

Give your answer to 1 decimal place.

…..........................m²

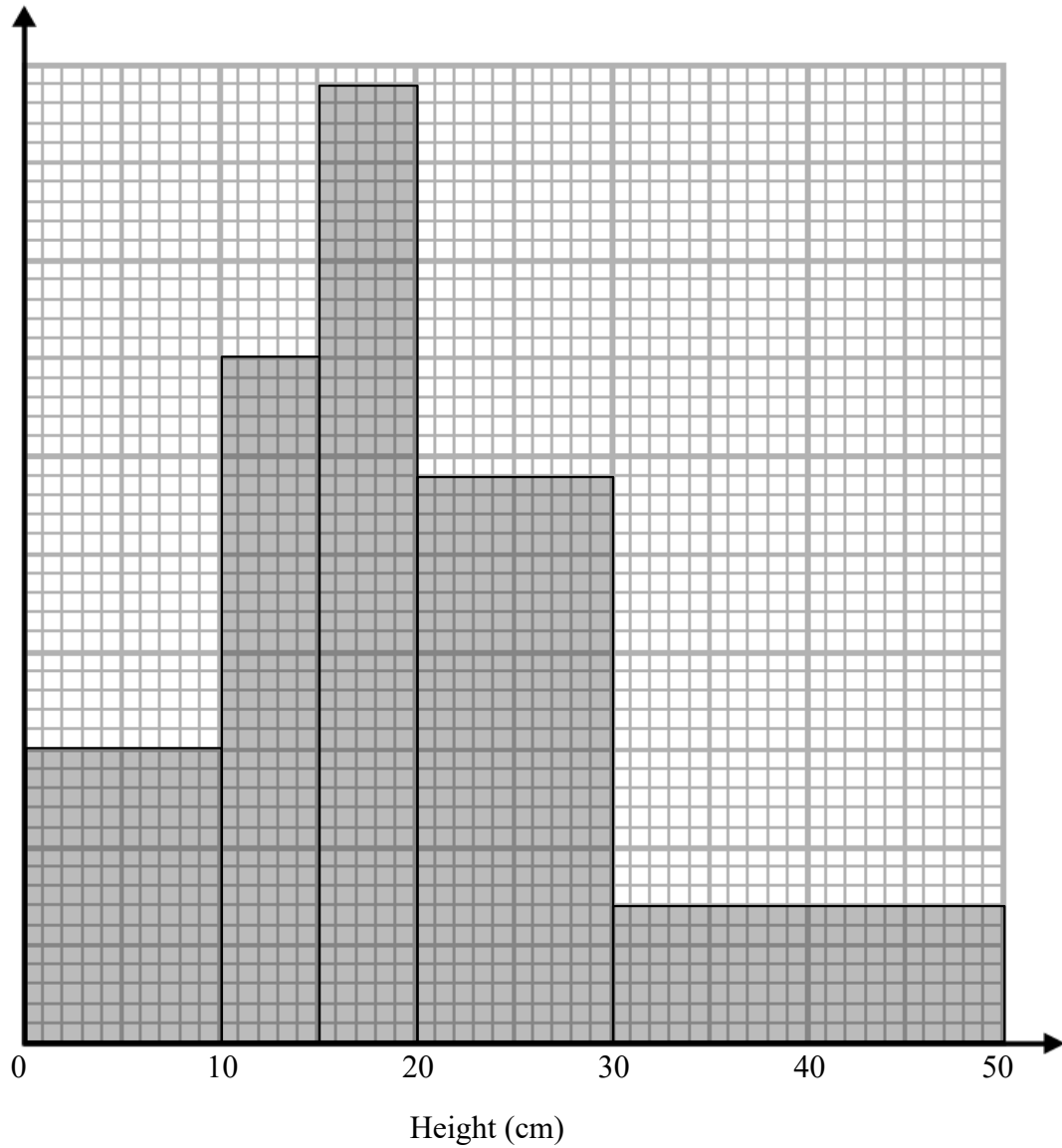**(Total for Question 8 is 5 marks)**

9   The diagram shows a triangular prism.

CD = 12 cm
AD = 20 cm
Angle ADC = 35°

Calculate the size of angle AFC.
Give your answer correct to 1 decimal place.

....°

(Total for Question 9 is 4 marks)

10 The histogram shows information about the height of some plants.

Height (cm)

(a) Work out an estimate for the proportion of plants over 25cm tall.

…...........................

(3)

(b) Explain why your answer to part a is only an estimate.

…...…............................

…...…............................

(1)

(Total for Question 10 is 4 marks)