

Name: _____

Maths Genie Stage 13

Test C

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.*

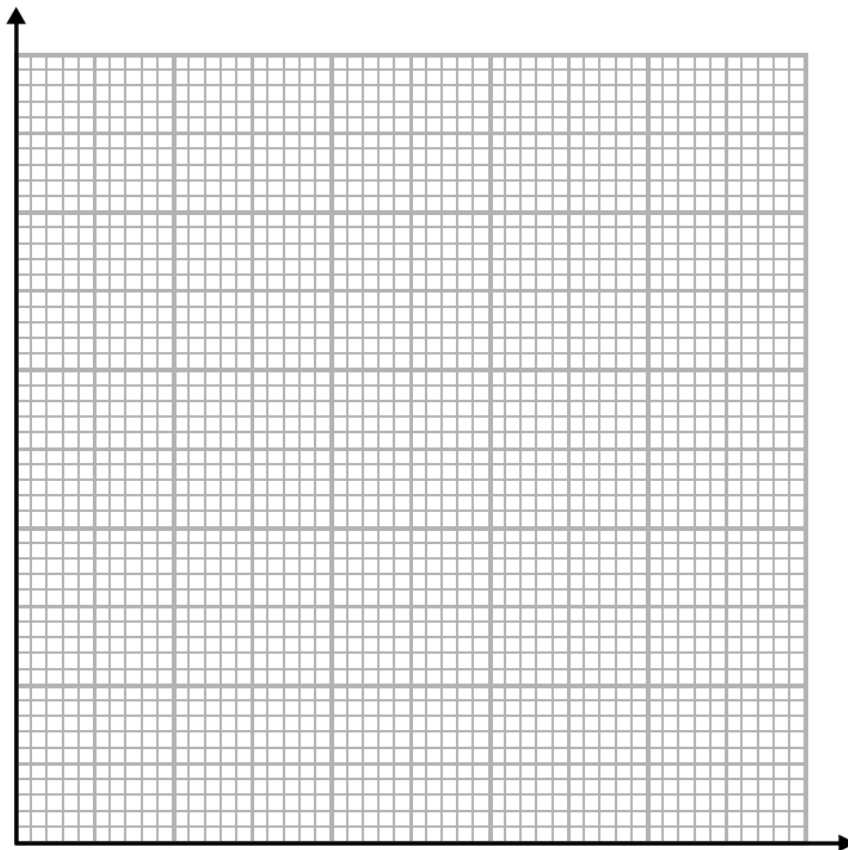
Advice

- 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 The table shows information about the age of 80 teachers.

Age (years)	Frequency
$20 < a \leq 30$	23
$30 < a \leq 35$	21
$35 < a \leq 40$	14
$40 < a \leq 50$	16
$50 < a \leq 65$	6

On the grid, draw a histogram for the information in the table.



(Total for question 1 is 3 marks)

2 Simplify fully $\frac{2x + 4}{5x - 15} \div \frac{x^2 - 8x - 20}{2x^2 - x - 15}$

(Total for Question 2 is 3 marks)

3 Prove that the sum of 3 consecutive even numbers is always a multiple of 6.

(Total for Question 3 is 2 marks)

4

$$V = IR$$

$I = 4.29$ correct to 2 decimal places

$R = 16.173$ correct to 3 decimal places

Work out the upper bound for V .

Give your answer to 2 decimal places.

.....
(Total for Question 4 is 3 marks)

5 (a) Write $3x^2 - 12x + 19$ in the form $a(x + b)^2 + c$ where a , b , and c are integers.

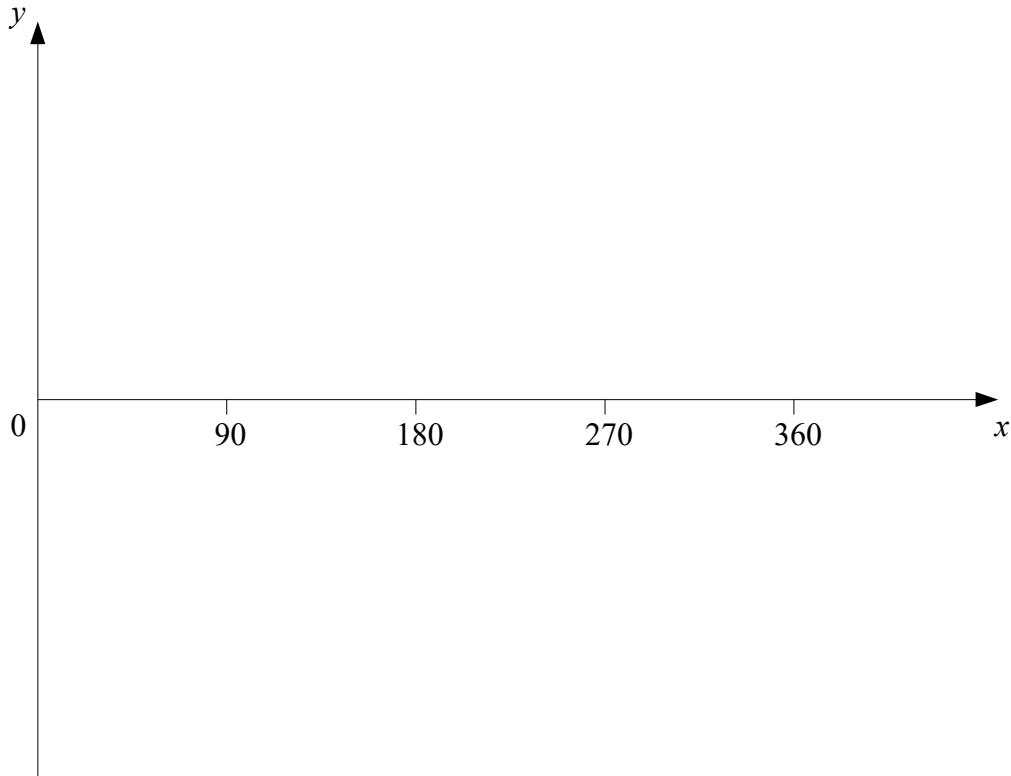
.....
(3)

(b) Hence, or otherwise, write down the coordinates of the turning point of the graph of $y = 3x^2 - 12x + 19$

.....
(1)

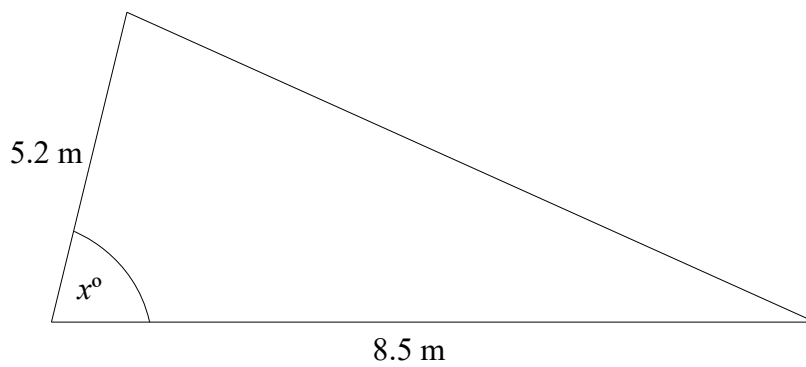
(Total for Question 5 is 4 marks)

6 Sketch the graph of $y = \sin x^\circ$ for $0 \leq x \leq 360$



(Total for Question 6 is 2 marks)

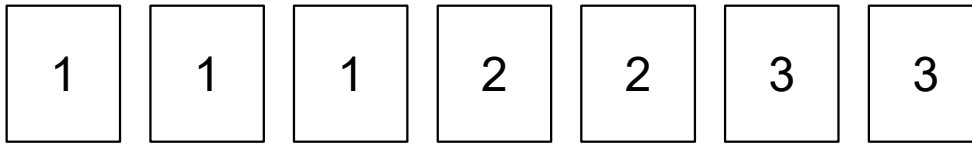
7



The area of the triangle is 22 m^2
Work out the value of x .
Give your answer to 3 significant figures.

(Total for Question 7 is 4 marks)

8 Here are seven number cards.



Helen takes a card at random.
She does not replace the card.

Helen then takes another card at random.

(a) Calculate the probability that both cards have the same number on them.

.....
(3)

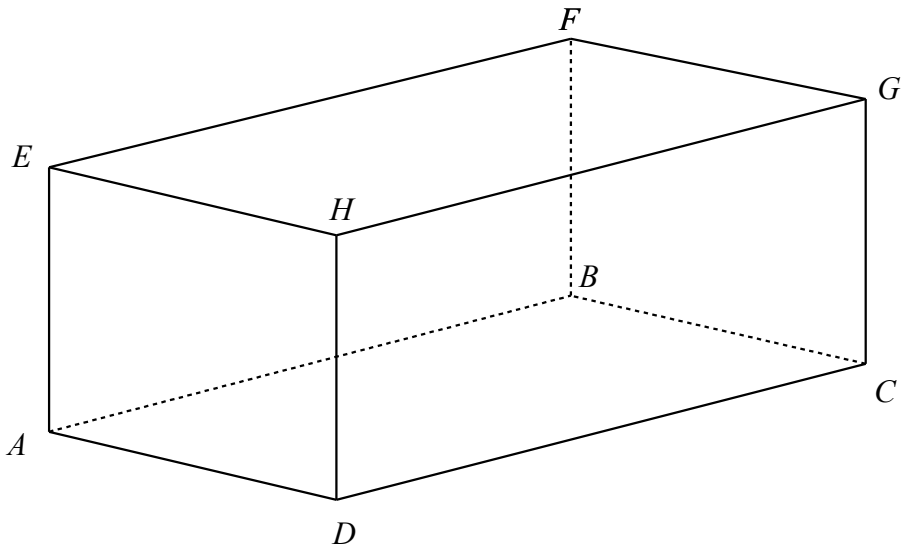
(b) Calculate the probability that the number on the first card Helen takes and the number on the second card Helen takes have a sum of 4.

.....
(3)

(Total for Question 8 is 6 marks)

9 The diagram shows a cuboid $ABCDEFGH$.

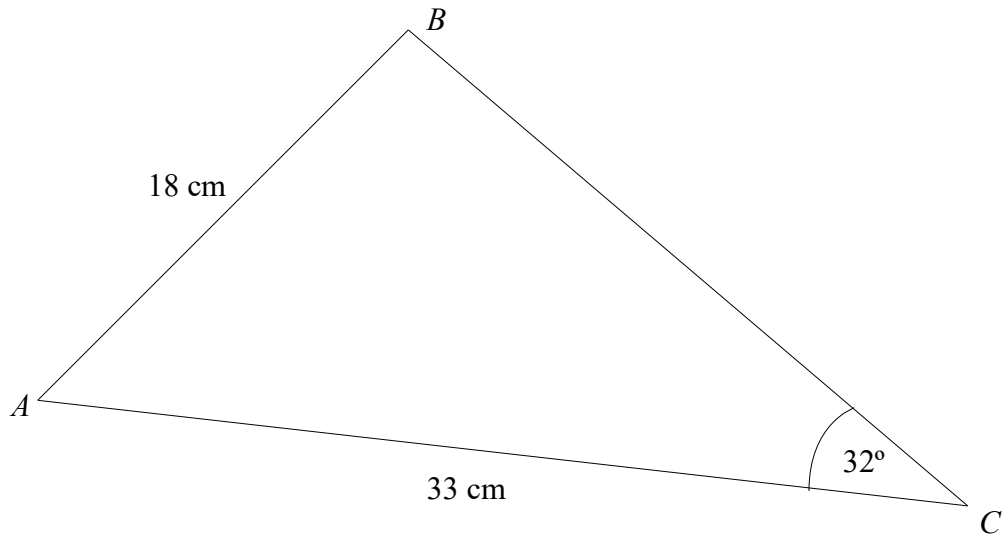
$AE = 4$ cm
 $AD = 5$ cm
 $DC = 8$ cm



Calculate the size of angle ECA .
Give your answer correct to 3 significant figures.

.....
(Total for Question 9 is 4 marks)

10



Angle ABC is obtuse.
Work out the size of angle ABC .
Give your answer to 3 significant figures.