

Name: _____

Maths Genie Stage 11

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 not 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.*

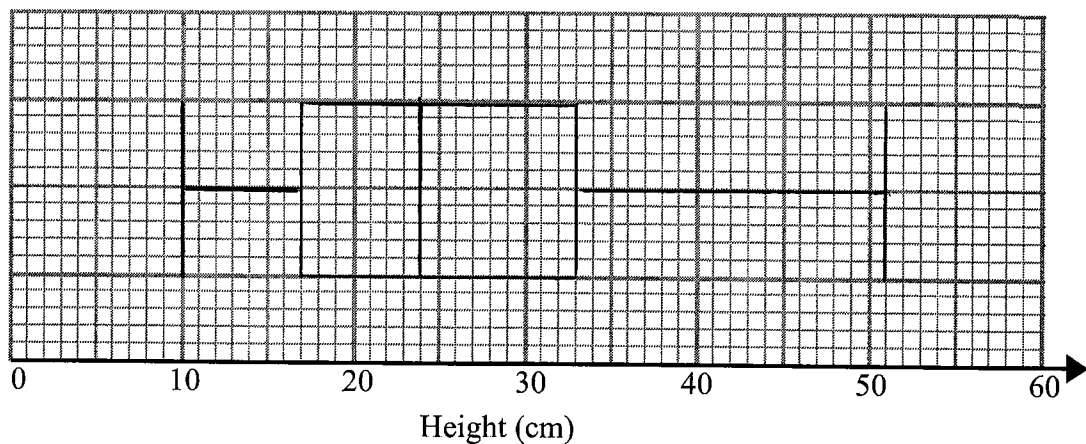
Advice

- 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 some information about the heights, in cm, of some plants.

Minimum	Lower Quartile	Median	Upper Quartile	Maximum
10	17	24	33	51

Draw a box plot for this information.



(Total for Question 1 is 2 marks)

2 Expand and Simplify $(x-2)(x+3)(x-4)$

$$(x^2 + 3x - 2x - 6)(x - 4)$$

$$(x^2 + x - 6)(x - 4)$$

$$x^3 - 4x^2 + x^2 - 4x - 6x + 24$$

$$x^3 - 3x^2 - 10x + 24$$

$$x^3 - 3x^2 - 10x + 24$$

(Total for Question 2 is 3 marks)

3 Write $3.\overline{245}$ as a fraction in its simplest form.

$$\begin{array}{r} 357 \\ 3 \overline{)1071} \end{array}$$

$$3.\overline{245} = x$$

$$32.\overline{45} = 10x$$

$$3245.\overline{45} = 1000x$$

$$3213 = 990x$$

$$x = \frac{3213}{990}$$

$$\frac{3213}{990} = \frac{1071}{330} = \frac{357}{110}$$

$$\begin{array}{r} 357 \\ 110 \end{array}$$

(Total for Question 3 is 3 marks)

4 Find the equation of the line perpendicular to $5y - 4x = 6$ which passes through $(0, 7)$

$$5y = 4x + 6$$

$$y = \frac{4}{5}x + \frac{6}{5}$$

$$m = \frac{4}{5}$$

$$\text{perp } m = -\frac{5}{4}$$

$$y = -\frac{5}{4}x + 7$$

(Total for Question 4 is 2 marks)

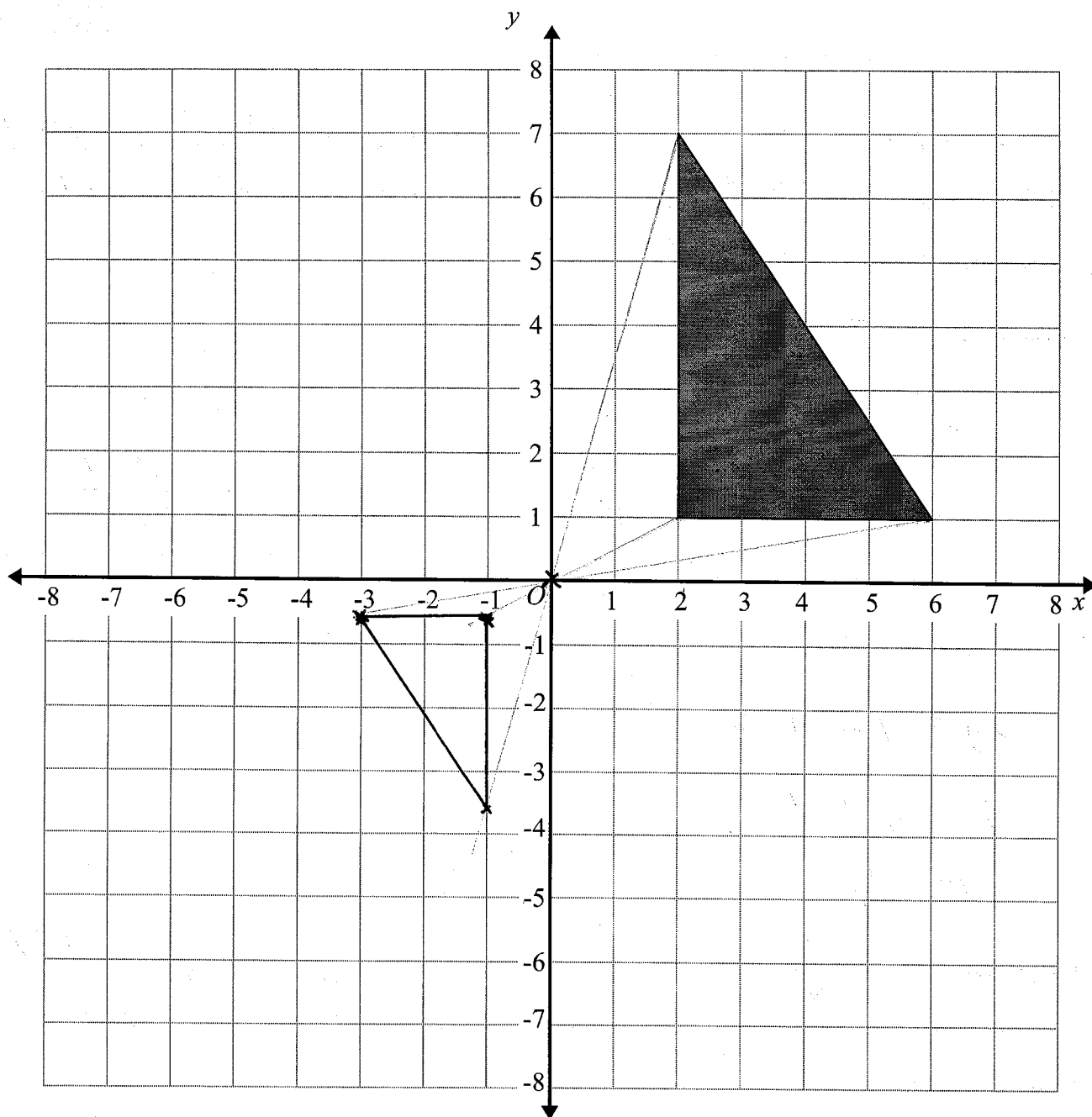
5 Find the value of $(27x^9)^{\frac{2}{3}}$

$$(3x^3)^2$$

$$9x^6$$

(Total for Question 5 is 2 marks)

6



On the grid, enlarge the triangle by scale factor -0.5 , centre O .

(Total for Question 6 is 2 marks)

$$\begin{pmatrix} 2 \\ 1 \end{pmatrix} \times -0.5 = \begin{pmatrix} -1 \\ -0.5 \end{pmatrix}$$

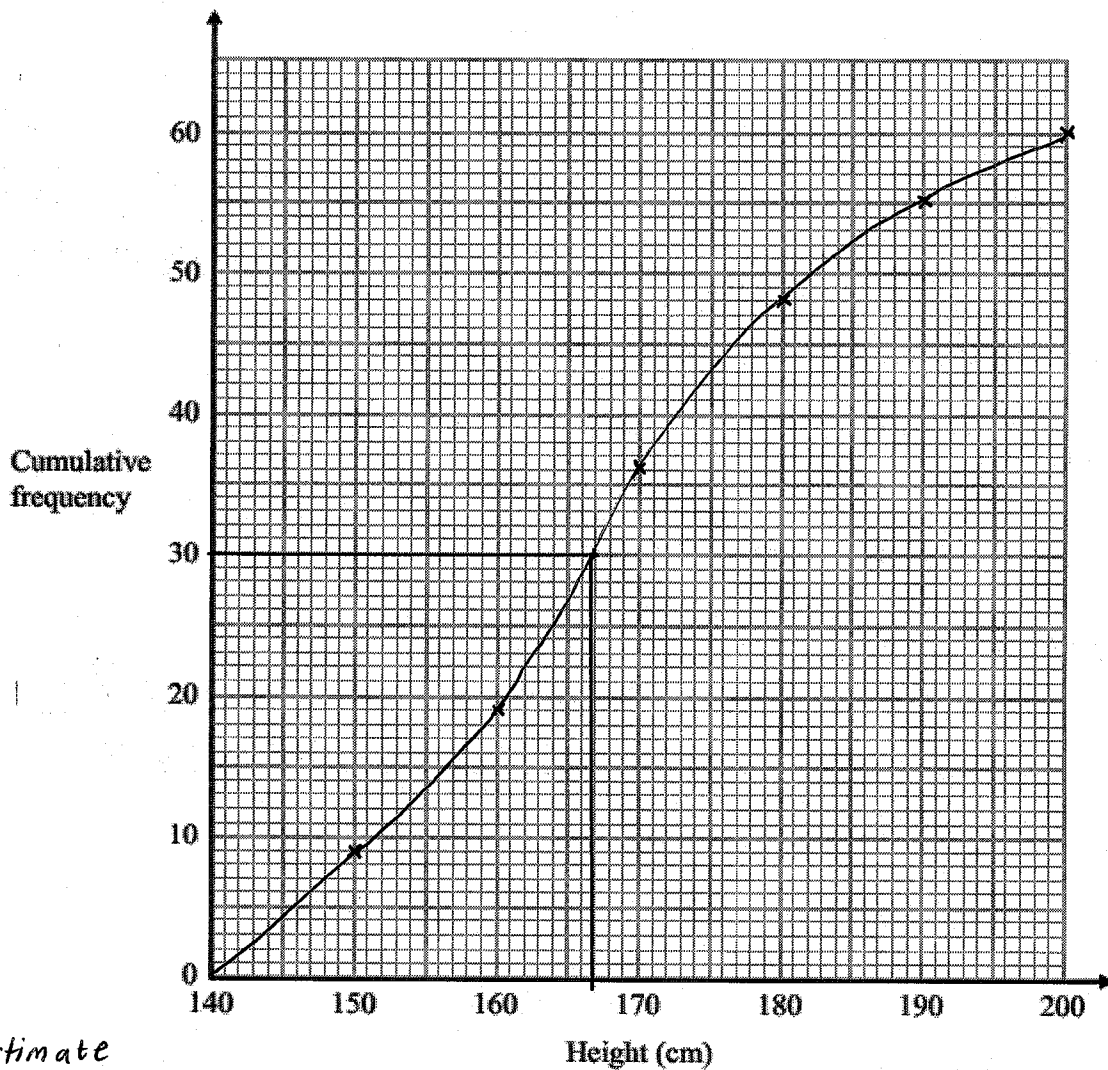
$$\begin{pmatrix} 6 \\ 1 \end{pmatrix} \times -0.5 = \begin{pmatrix} -3 \\ -0.5 \end{pmatrix}$$

$$\begin{pmatrix} 2 \\ 7 \end{pmatrix} \times -0.5 = \begin{pmatrix} -1 \\ -3.5 \end{pmatrix}$$

7 The cumulative frequency table shows the height, in cm, of some tomato plants.

Height	Cumulative Frequency
$140 < h \leq 150$	9
$140 < h \leq 160$	19
$140 < h \leq 170$	36
$140 < h \leq 180$	48
$140 < h \leq 190$	55
$140 < h \leq 200$	60

(a) On the grid, plot a cumulative frequency graph for this information.



Estimate

(b) ~~Find~~ the median height.

(2)

.....167.....cm
166/167⁽¹⁾

(Total for Question 7 is 3 marks)

8 Make x the subject of the formula $\frac{a}{b} = \frac{x}{x-5}$

$$a(x-5) = bx$$

$$ax - 5a = bx$$

$$ax - bx = 5a$$

$$x(a-b) = 5a$$

$$x = \frac{5a}{a-b}$$

$$\text{or } x = \frac{-5a}{b-a}$$

$$x = \frac{5a}{a-b}$$

(Total for Question 8 is 3 marks)

9 Write $(4 - \sqrt{3})^2$ in the form $a + b\sqrt{3}$, where a and b are integers.

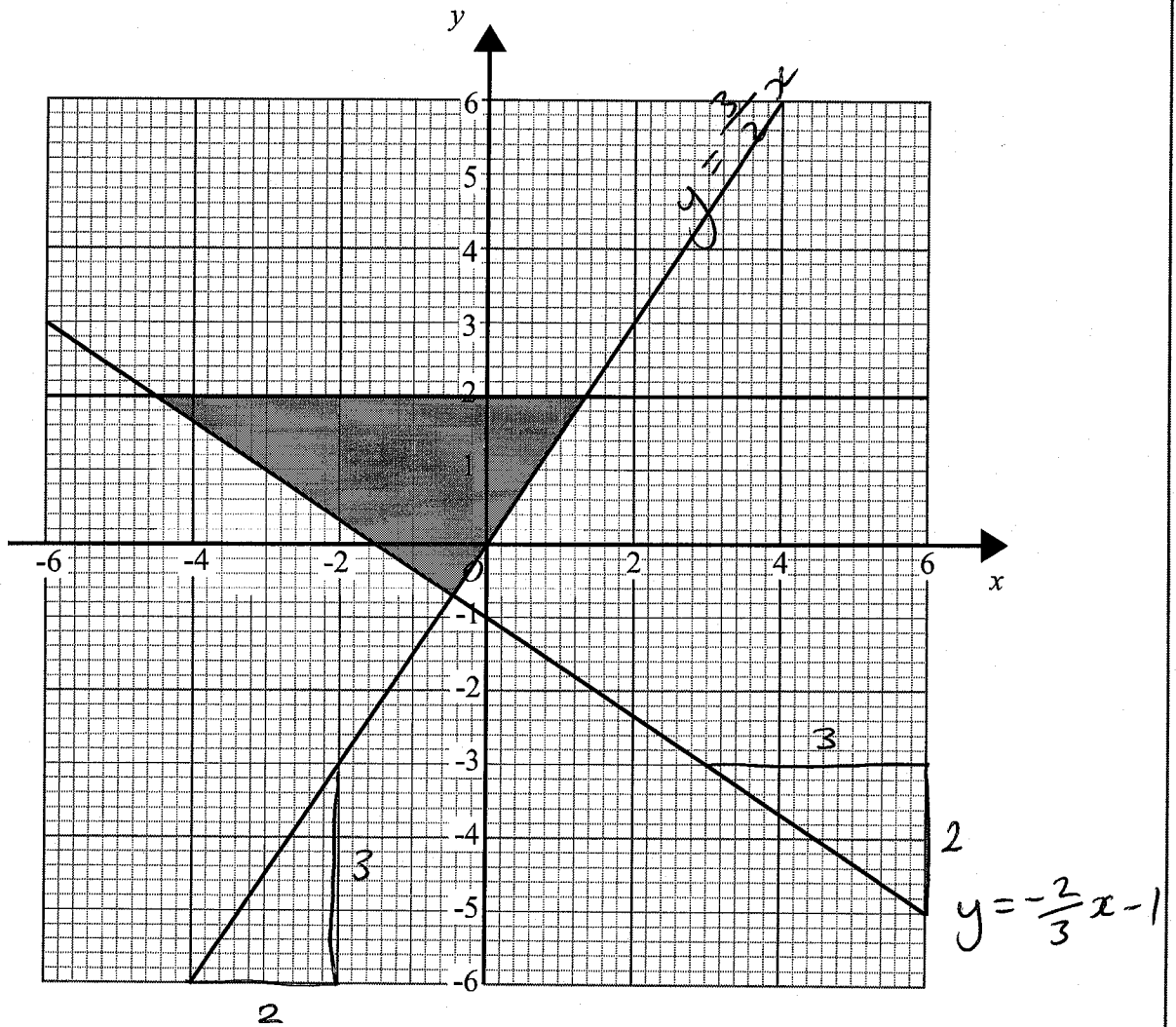
$$(4 - \sqrt{3})(4 - \sqrt{3})$$

$$16 - 4\sqrt{3} - 4\sqrt{3} + 3$$

$$19 - 8\sqrt{3}$$

$$19 - 8\sqrt{3}$$

(Total for Question 9 is 2 marks)



Write down the three inequalities that define the shaded region

$$y \leq 2$$

$$y \geq \frac{3}{2}x$$

$$y \geq -\frac{2}{3}x - 1$$

(Total for Question 10 is 3 marks)