Name: _____

Maths Genie Stage 11

Test A

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 Expand and Simplify $(x-3)(2x+1)(x+4)$

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

$(2x^2 - 5x - 3)(x + 4)$

$2x^3 + 8x^2 - 5x^2 - 20x - 3x - 12$

$2x^3 + 3x^2 - 23x - 12$

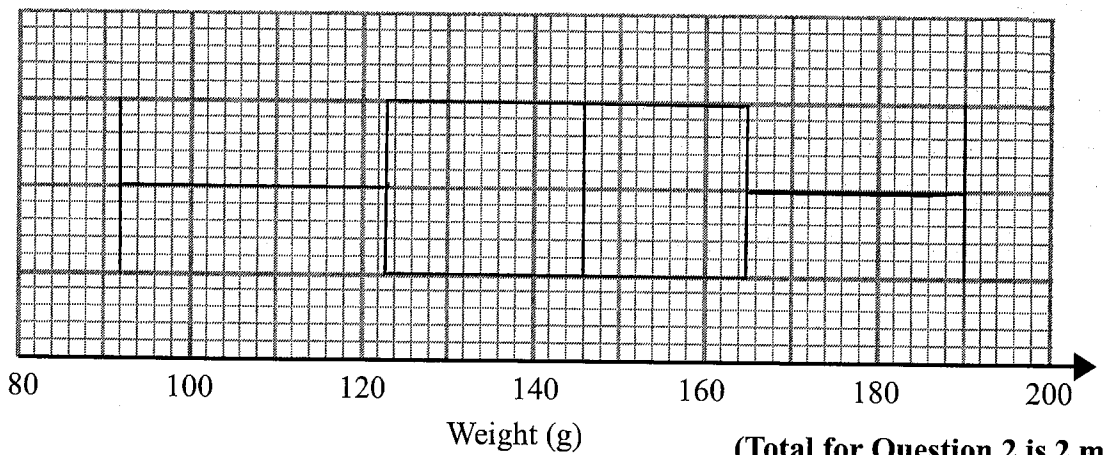
$2x^3 + 3x^2 - 23x - 12$

(Total for Question 1 is 3 marks)

2 The table shows some information about the weights, in grams, of some potatoes.

Range	Lower Quartile	Median	Upper Quartile	Maximum
98	123	146	165	190

Draw a box plot for this information. $190 - 98 = 92$ (minimum value)

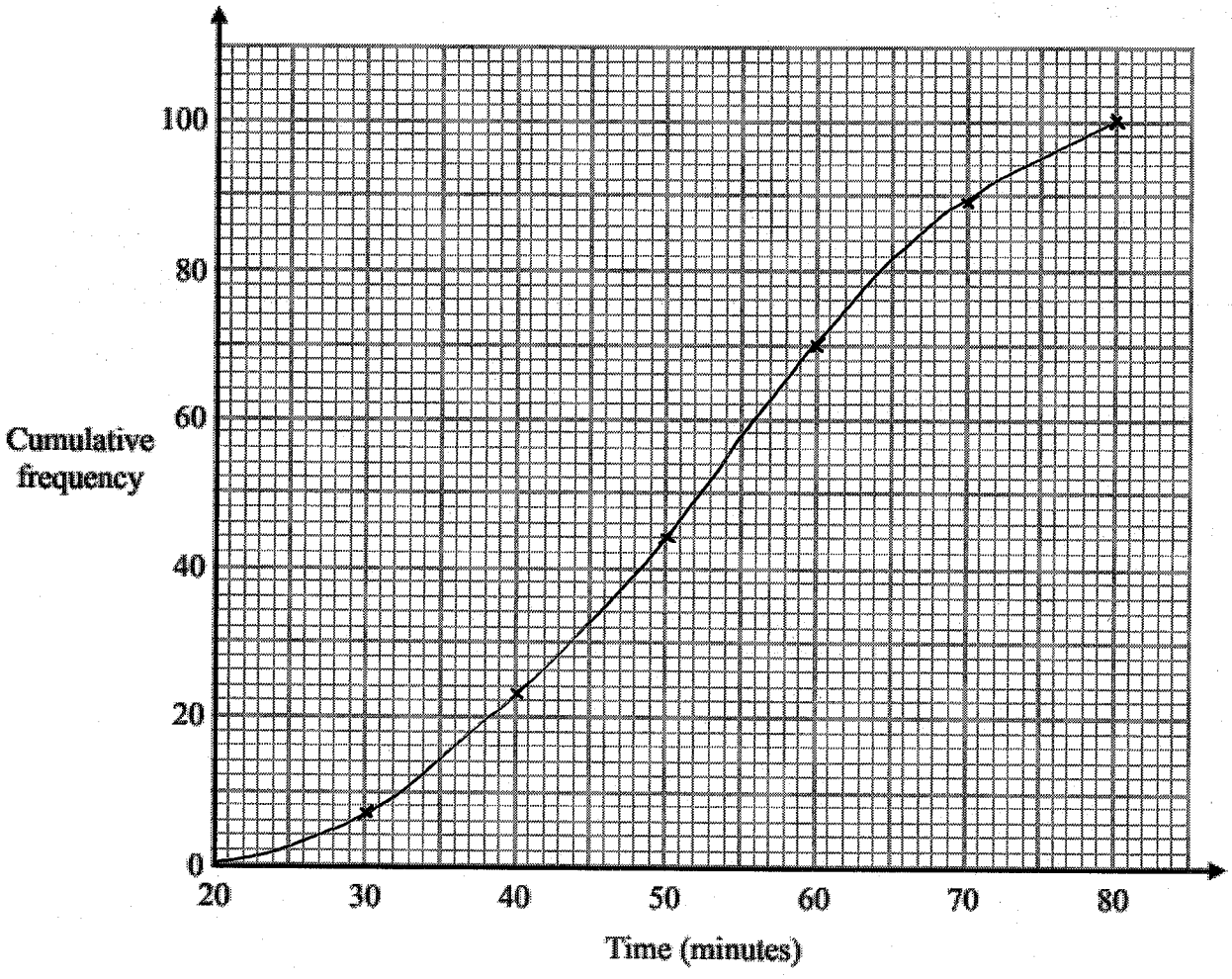


(Total for Question 2 is 2 marks)

3 The frequency table shows the time taken for 100 people to travel to an event.

Time (minutes)	Frequency	C.F
$20 < t \leqslant 30$	7	7
$30 < t \leqslant 40$	16	23
$40 < t \leqslant 50$	21	44
$50 < t \leqslant 60$	26	70
$60 < t \leqslant 70$	19	89
$70 < t \leqslant 80$	11	100

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



(Total for Question 3 is 2 marks)

4 Write $0.1\dot{8}$ as a fraction in its simplest form.

$0.1\dot{8} = x$

$1.\dot{8} = 10x$

$18.\dot{8} = 100x$

$17 = 90x$

$x = \frac{17}{90}$

$\frac{17}{90}$

(Total for Question 4 is 2 marks)

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5 Find the value of $125^{-\frac{2}{3}}$

5^{-2}

$25^{-1} = \frac{1}{25}$

$\frac{1}{25}$

(Total for Question 5 is 2 marks)

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6 Simplify fully $\frac{(5+3\sqrt{2})(5-3\sqrt{2})}{\sqrt{7}}$

You must show all your working.

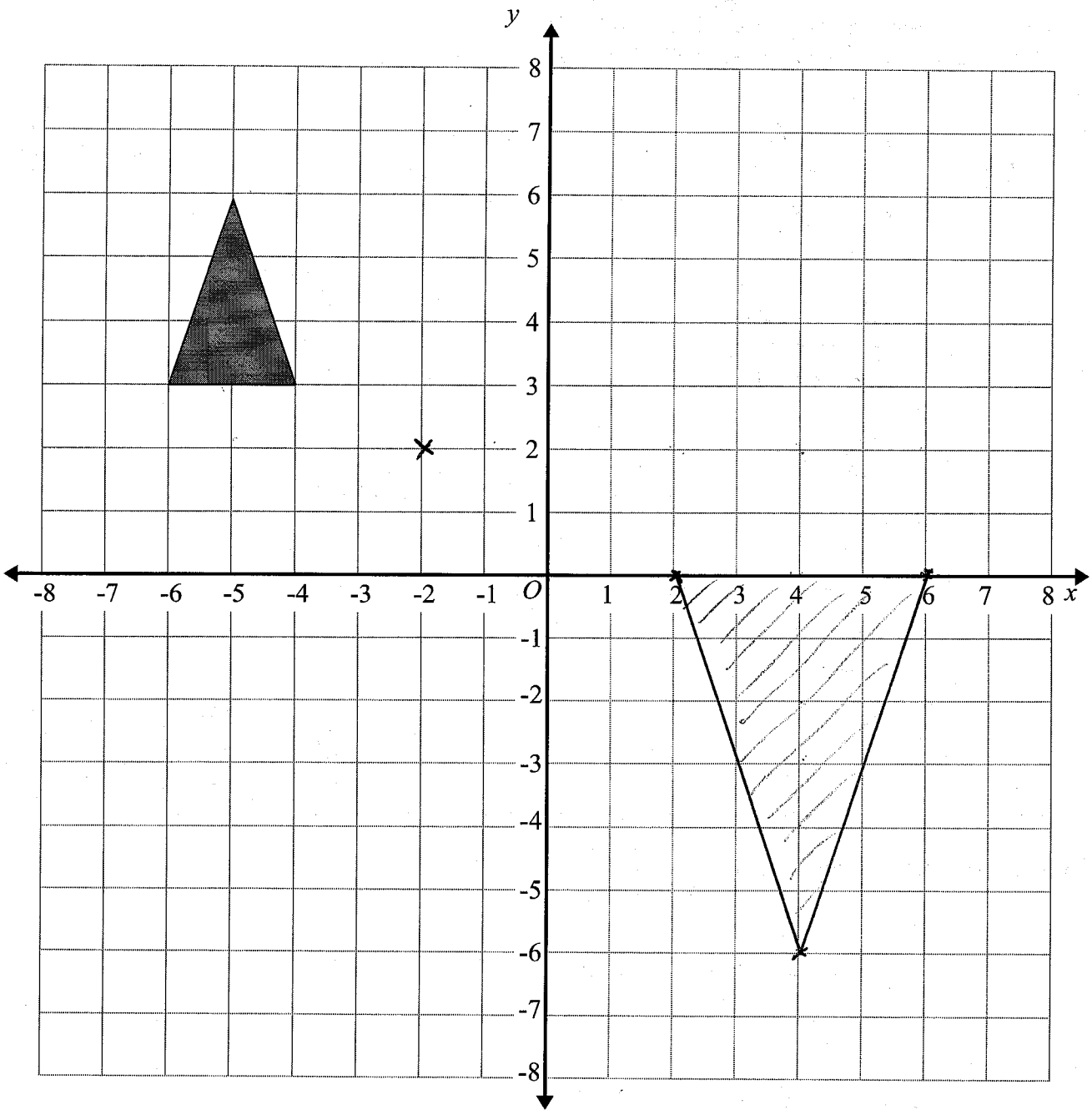
$\frac{25 - 15\sqrt{2} + 15\sqrt{2} - 9(2)}{\sqrt{7}}$

$\frac{25 - 18}{\sqrt{7}}$

$\frac{7}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = \frac{7\sqrt{7}}{7} = \sqrt{7}$

(Total for Question 6 is 3 marks)

7



On the grid, enlarge the triangle by scale factor -2. centre (-2,2)

(Total for Question 7 is 2 marks)

$$\begin{pmatrix} -2 \\ 1 \end{pmatrix} \times -2 = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$$

$$\begin{pmatrix} -4 \\ 1 \end{pmatrix} \times -2 = \begin{pmatrix} 8 \\ -2 \end{pmatrix}$$

$$\begin{pmatrix} -3 \\ 4 \end{pmatrix} \times -2 = \begin{pmatrix} 6 \\ -8 \end{pmatrix}$$

$x_1\ y_1 \quad x_2\ y_2$

8 Line A passes through the points (-1, 2) and (3, 8)
Find the equation of the line parallel to A that passes through (6, 2)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{8 - 2}{3 - -1}$$

$$= \frac{6}{4}$$

$$= \frac{3}{2}$$

$x \quad y$

$$y = \frac{3}{2}x + c \qquad (6, 2)$$

$$2 = \frac{3}{2}(6) + c$$

$$2 = 9 + c$$

$$-7 = c$$

$$y = \frac{3}{2}x - 7$$

(Total for Question 8 is 3 marks)

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9 Make x the subject of the formula $y = \frac{x + 5}{x - 8}$

$$y(x - 8) = (x + 5)$$

$$xy - 8y = x + 5$$

$$xy = x + 5 + 8y$$

$$xy - x = 8y + 5$$

$$x(y - 1) = 8y + 5$$

$$x = \frac{8y + 5}{y - 1}$$

$$x = \frac{8y + 5}{y - 1}$$

(Total for Question 9 is 3 marks)

10 On the grid shade the region that satisfies all these inequalities

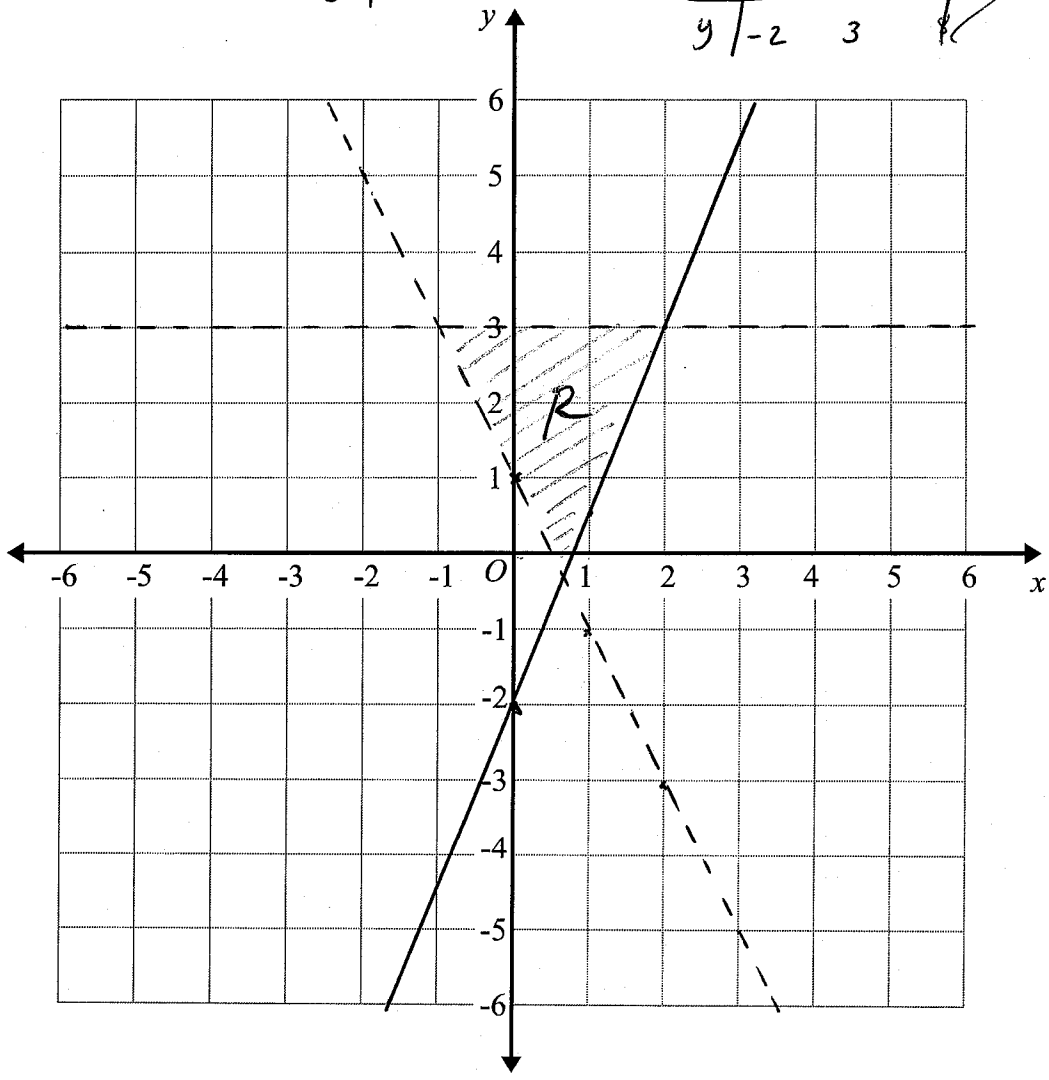
$y < 3$ $\quad y > -2x + 1$ $\quad 2y \geq 5x - 4$

Label the region **R**.

x	0	1	2
y	1	-1	-3

$y \geqslant \frac{5}{2}x - 2$

x	0	2	4	1
y	-2	3	8	$\frac{1}{2}$



(Total for Question 10 is 3 marks)