

Name: \_\_\_\_\_

# Maths Genie Stage 11

## 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 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.*

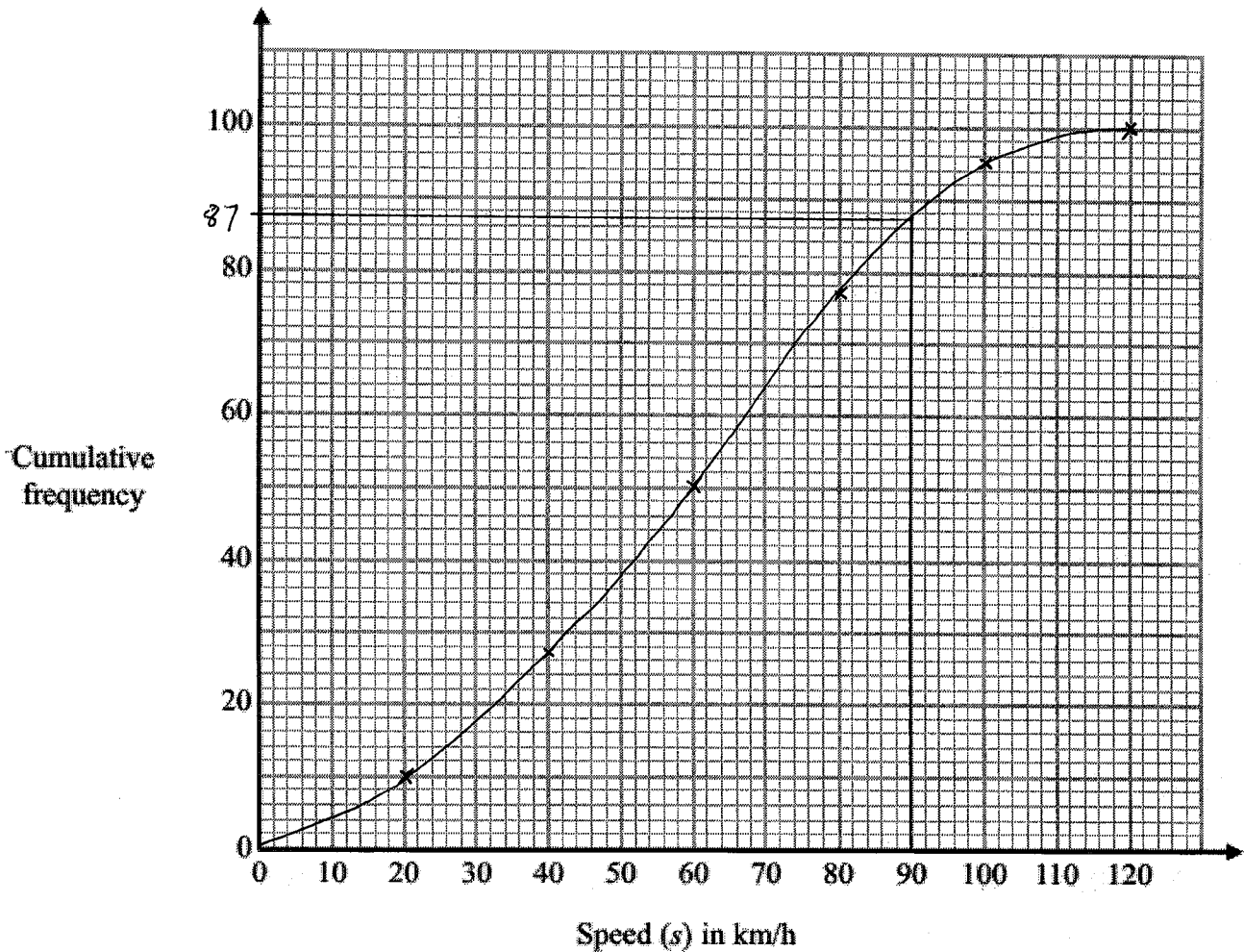
### Advice

- 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 frequency table shows the speeds of 100 cars.

Speed (km/h)	Frequency	C.F
$0 < s \leq 20$	10	10
$20 < s \leq 40$	17	27
$40 < s \leq 60$	23	50
$60 < s \leq 80$	27	77
$80 < s \leq 100$	18	95
$100 < s \leq 120$	5	100

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



(b) Find an estimate for the number of cars travelling over 90 km/h. (2)

$$100 - 87 = 13$$

13  
 .....  
 (12-14)(1)  
 (Total for Question 1 is 3 marks)

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

$$(2x^2 + 3x + 4x + 6)(3x + 1)$$

$$(2x^2 + 7x + 6)(3x + 1)$$

$$6x^3 + 2x^2 + 21x^2 + 7x + 18x + 6$$

$$6x^3 + 23x^2 + 25x + 6$$

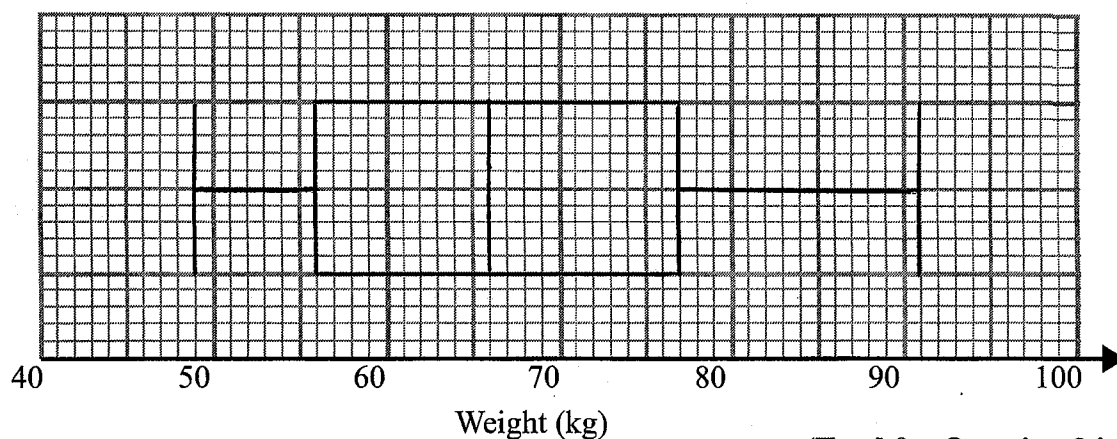
$$\underline{6x^3 + 23x^2 + 25x + 6}$$

(Total for Question 2 is 3 marks)

3 The weights of 11 pigs, in kg, are recorded below.

49 52 56 62 66 66 69 71 77 78 91

Draw a box plot for this information.



(Total for Question 3 is 2 marks)

- 4 Write  $5\sqrt{75}$  in the form  $k\sqrt{3}$ , where  $k$  is an integer.

$$5 \times \sqrt{25} \times \sqrt{3}$$

$$5 \times 5 \times \sqrt{3}$$

$$25 \times \sqrt{3}$$

$$25\sqrt{3}$$

$$25\sqrt{3}$$

(Total for Question 4 is 2 marks)

- 5 Find the value of  $\left(\frac{27}{125}\right)^{-\frac{2}{3}}$

$$\left(\frac{3}{5}\right)^{-2} = \left(\frac{9}{25}\right)^{-1}$$

$$\frac{25}{9}$$

(Total for Question 5 is 2 marks)

- 6 Make  $x$  the subject of the formula  $ax + y = 4x - 2b$

$$ax + y + 2b = 4x$$

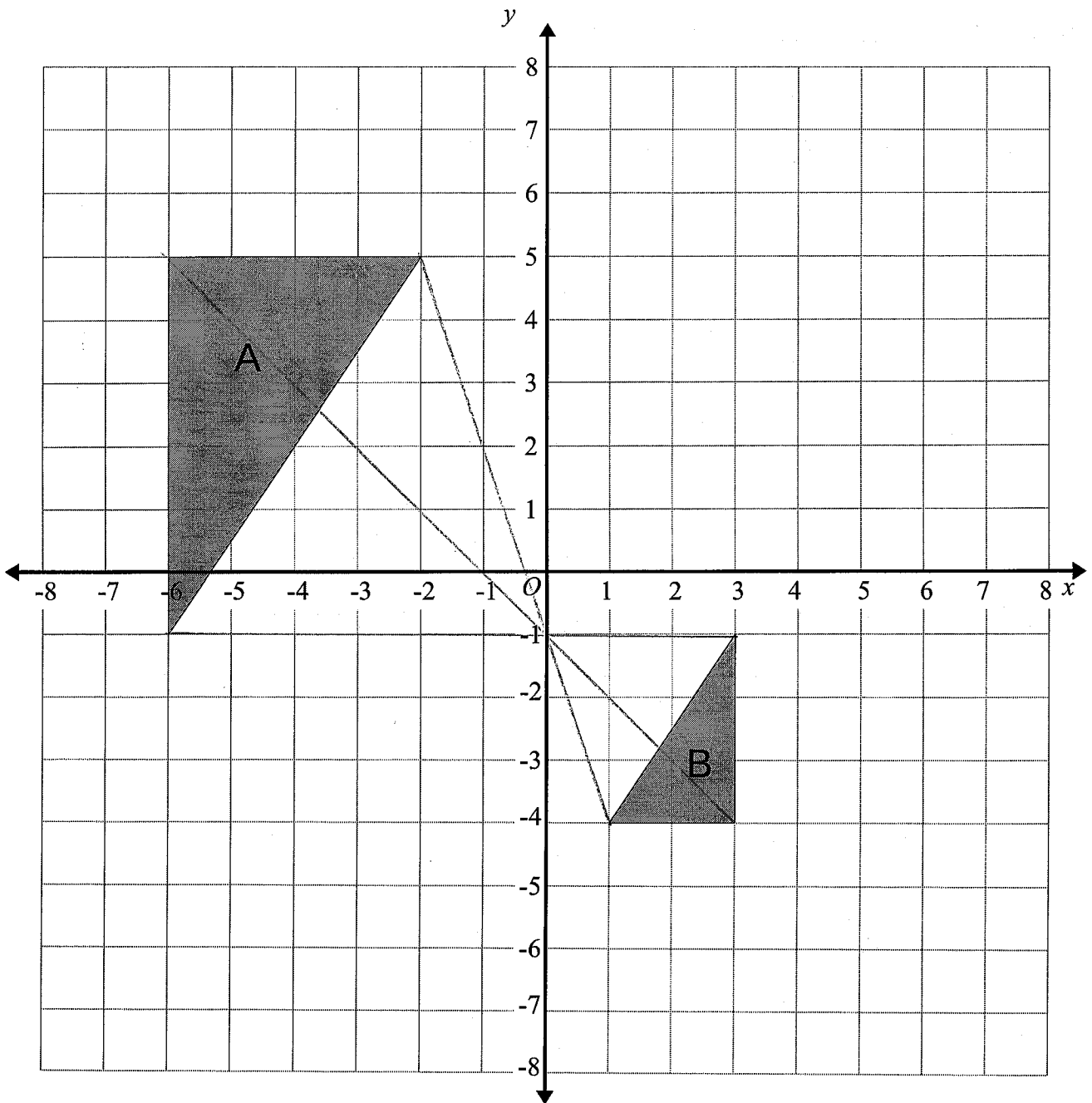
$$y + 2b = 4x - ax$$

$$y + 2b = x(4 - a)$$

$$\frac{y + 2b}{4 - a} = x$$

$$x = \frac{y + 2b}{4 - a}$$

(Total for Question 6 is 3 marks)



Describe fully the single transformation which maps triangle A onto triangle B.

..... Enlargement, scale factor  $-\frac{1}{2}$ ,  
 ..... centre  $(0, -1)$   
 .....

(Total for Question 7 is 2 marks)

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

$$x + y < 5$$

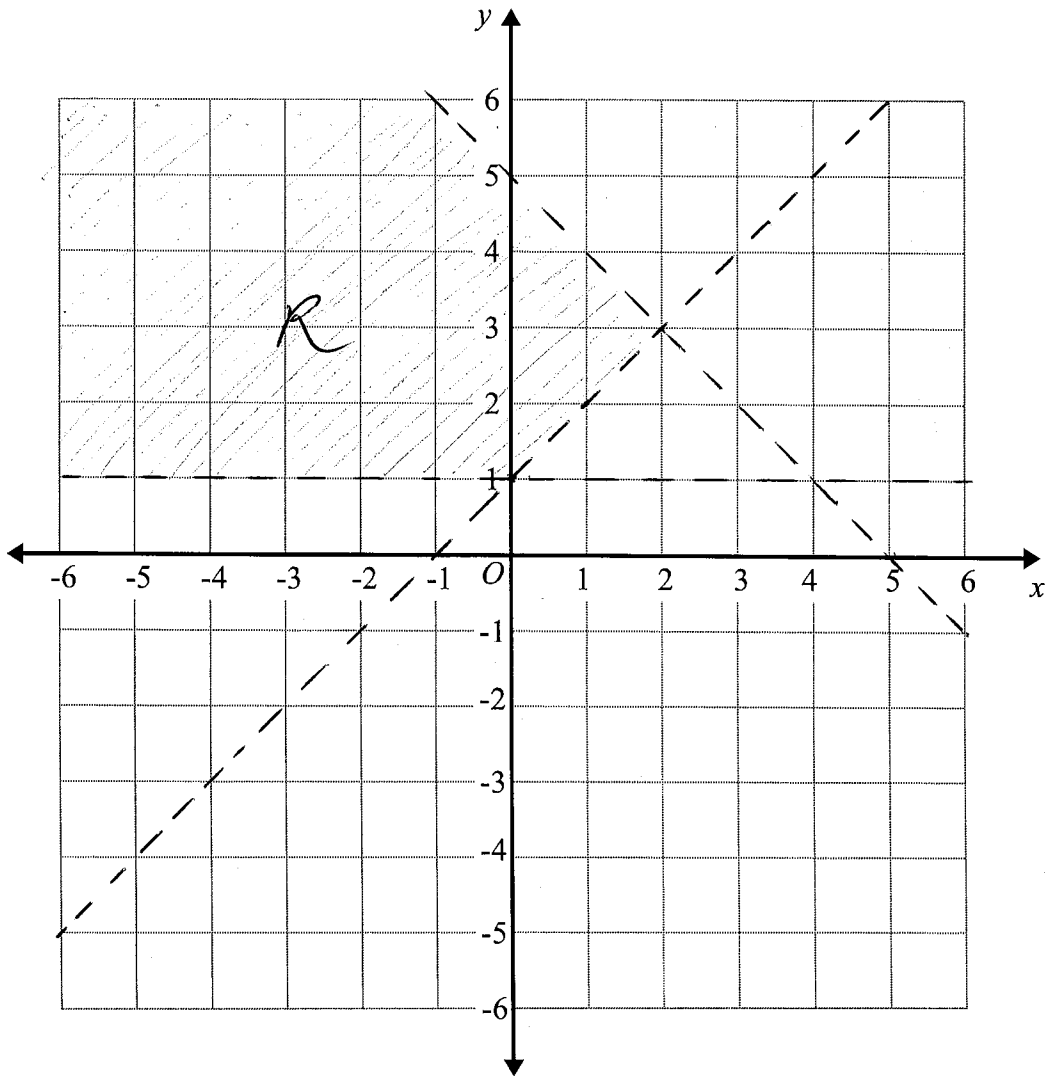
$$y > x + 1$$

$$y > 1$$

Label the region R.

$$\begin{pmatrix} 5, 0 \\ 0, 5 \end{pmatrix}$$

$x$	0	1	2
$y$	1	2	3



(Total for Question 8 is 3 marks)

9 Write  $0.\dot{4}\dot{5}$  as a fraction in its simplest form.

$$0.\dot{4}\dot{5} = x$$

$$45.\dot{4}\dot{5} = 100x$$

$$45 = 99x$$

$$x = \frac{45}{99}$$

$$x = \frac{45}{99} = \frac{5}{11}$$

$$\frac{5}{11}$$

(Total for Question 9 is 2 marks)

10 Line A passes through the points  $(2, 1)$  and  $(8, 10)$   
Line B passes through the points  $(1, 7)$  and  $(-3, 1)$   
Show that Line A and Line B are parallel.

Line A

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

$$= \frac{10 - 1}{8 - 2}$$

$$= \frac{9}{6}$$

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

Line B

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

$$= \frac{1 - 7}{-3 - 1}$$

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

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

Same gradient  $\therefore$  parallel

(Total for Question 10 is 3 marks)