Algebra and graphs – 2025 Specimen IGCSE 0580 Math

1. Specimen/2025/Paper_01/No.12

(a) Factorise.

$9x + 12$

..... [1]

(b) Solve.

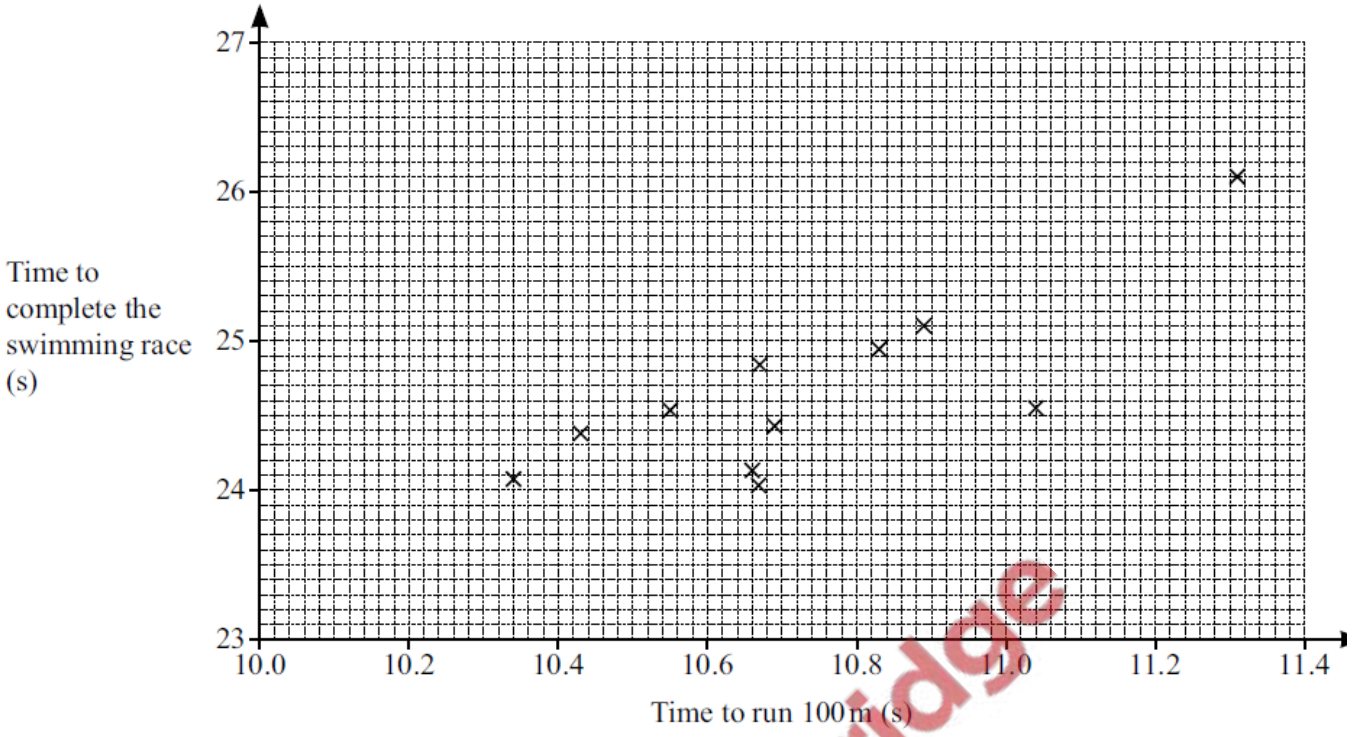
$6x - 5 = 2x + 13$

$x =$ ..... [2]

2. Specimen/2025/Paper_01/No.15

(a) As part of a sports competition, 14 athletes run 100 m and complete a swimming race.

The scatter diagram shows the times, in seconds, to run 100 m and the times, in seconds, to complete the swimming race, for 11 of these athletes.



The table shows the times for the other 3 athletes.

Time to run 100 m (s)	10.20	10.86	11.04
Time to complete the swimming race (s)	23.5	25.4	24.9

(i) On the scatter diagram, plot these three points. [2]

(ii) State the type of correlation shown in the scatter diagram.

..... [1]

(iii) On the scatter diagram, draw a line of best fit. [1]

(iv) Another athlete completes the swimming race in 23.8 seconds.

Use your line of best fit to estimate the athlete's time to run 100 m.

..... s [1]

(b) The table shows the diameter, in centimetres, and the mass, in grams, of nine medals.

Diameter (cm)	85	85	70	60	68	70	70	60	66
Mass (g)	500	412	200	135	180	181	231	152	102

(i) Write down the mode of the diameters.

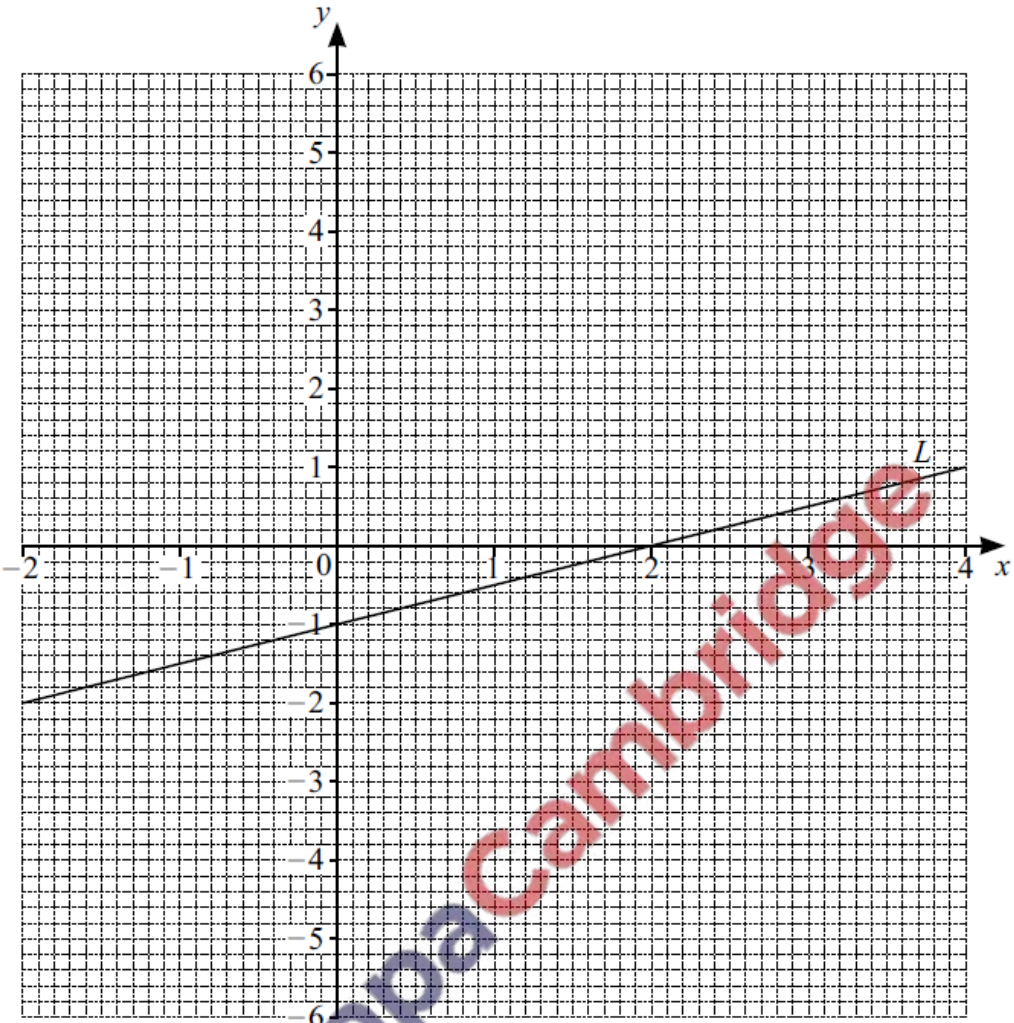
..... cm [1]

(ii) Find the median of the masses.

..... g [2]

3. Specimen/2025/Paper_01/No.16

The line L is shown on the grid.



(a) Find the equation of line L in the form $y = mx + c$.

$y =$ ..... [3]

4. Specimen/2025/Paper_01/No.19

Rearrange the formula to make t the subject.

$w = 7t - 5$

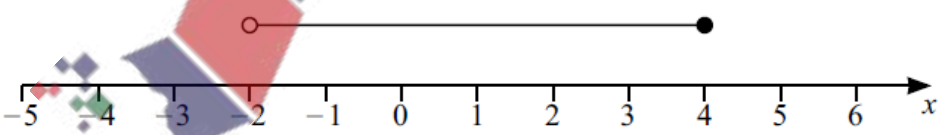
$t =$ ..... [2]

5. Specimen/2025/Paper_01/No.20

(a) Write down the smallest **even** integer that satisfies the inequality $y > 2.5$.

$y =$ ..... [1]

(b) Write an inequality, in terms of x, to represent the interval shown on this number line.



..... [2]

6. Specimen/2025/Paper_01/No.23

Solve the simultaneous equations.

$$3x - 5y = 22$$
$$7x + 10y = 8$$

$x =$ .....

$y =$ .....

[3]

7. Specimen/2025/Paper_02/No.9

In a sequence

$$T_1 = 17 \qquad T_2 = 12 \qquad T_3 = 7 \qquad T_4 = 2.$$

Find

(a) T_5

..... [1]

(b) T_n.

..... [2]

8. Specimen/2025/Paper_02/No.18

$f(x) = 3 - 2x$ $g(x) = 2x + 3$ $h(x) = 2^x$

(a) (i) Find $f(-3)$.

..... [1]

(ii) Find $gf(-3)$.

..... [1]

(b) Find $f^{-1}(x)$.

$f^{-1}(x) =$ ..... [2]

(c) Find x when $gg(x) = 7$.

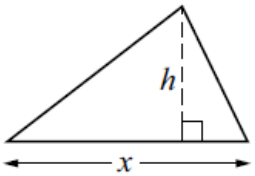
$x =$ ..... [3]

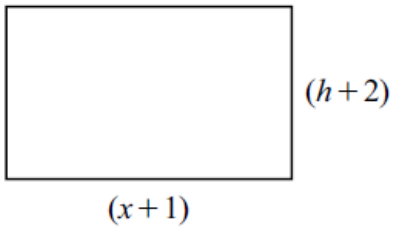
(d) Find x when $h^{-1}(x) = 5$.

$x =$ ..... [2]

9. Specimen/2025/Paper_02/No.21

In this question, all measurements are in centimetres.





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The height of the triangle is h and the height of the rectangle is $(h + 2)$.
The length of the base of the triangle is x and the length of the rectangle is $(x + 1)$.
The area of the triangle is 11 cm^2 and the area of the rectangle is 39 cm^2.

(a) Write down an expression, in terms of x, for the height of the rectangle.

..... [1]

(b) Show that $2x^2 - 15x + 22 = 0$.

[3]

(c) By factorising and solving $2x^2 - 15x + 22 = 0$, find the two possible heights of the triangle.

$h =$ ..... or $h =$ ..... [5]

10. Specimen/2025/Paper_02/No.23

Write as a single fraction in its simplest form.

$$\frac{3}{x-4} - \frac{4}{x+3}$$

..... [3]

11. Specimen/2025/Paper_02/No.24

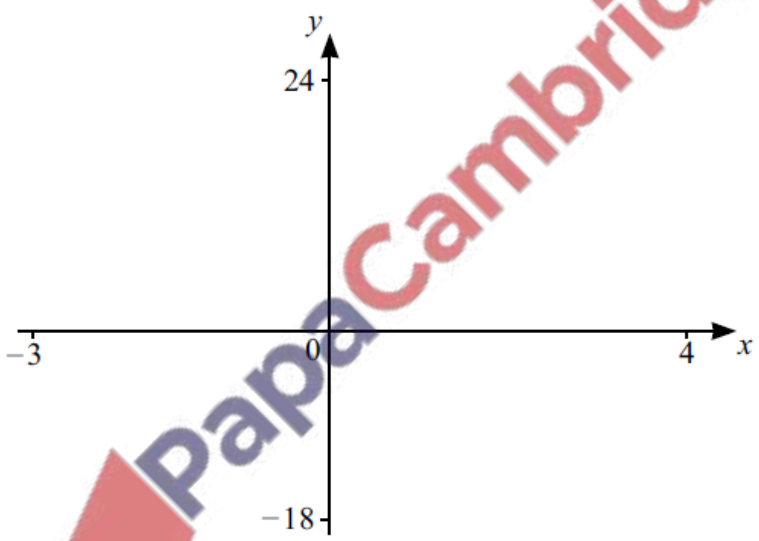
(a) Write $x^2 - 4x + 7$ in the form $(x - a)^2 + b$.

..... [2]

(b) Write down the coordinates of the turning point of the graph of $y = x^2 - 4x + 7$.

(..... , ...) [1]

12. Specimen/2025/Paper_02/No.26



$f(x) = x(x + 2)(x - 3)$

(a) On the diagram, sketch the graph of $y = f(x)$ for $-3 \leqslant x \leqslant 4$.
Show the values of the intersections with the axes. [3]

(b) Expand and simplify.

$x(x + 2)(x - 3)$

..... [3]

(c) A is the point $(1, -6)$.
The tangent to the graph of $y = f(x)$ at A meets the y-axis at B.

Find the coordinates of B.

(..... , ...) [5]

13. Specimen/2025/Paper_03/No.8

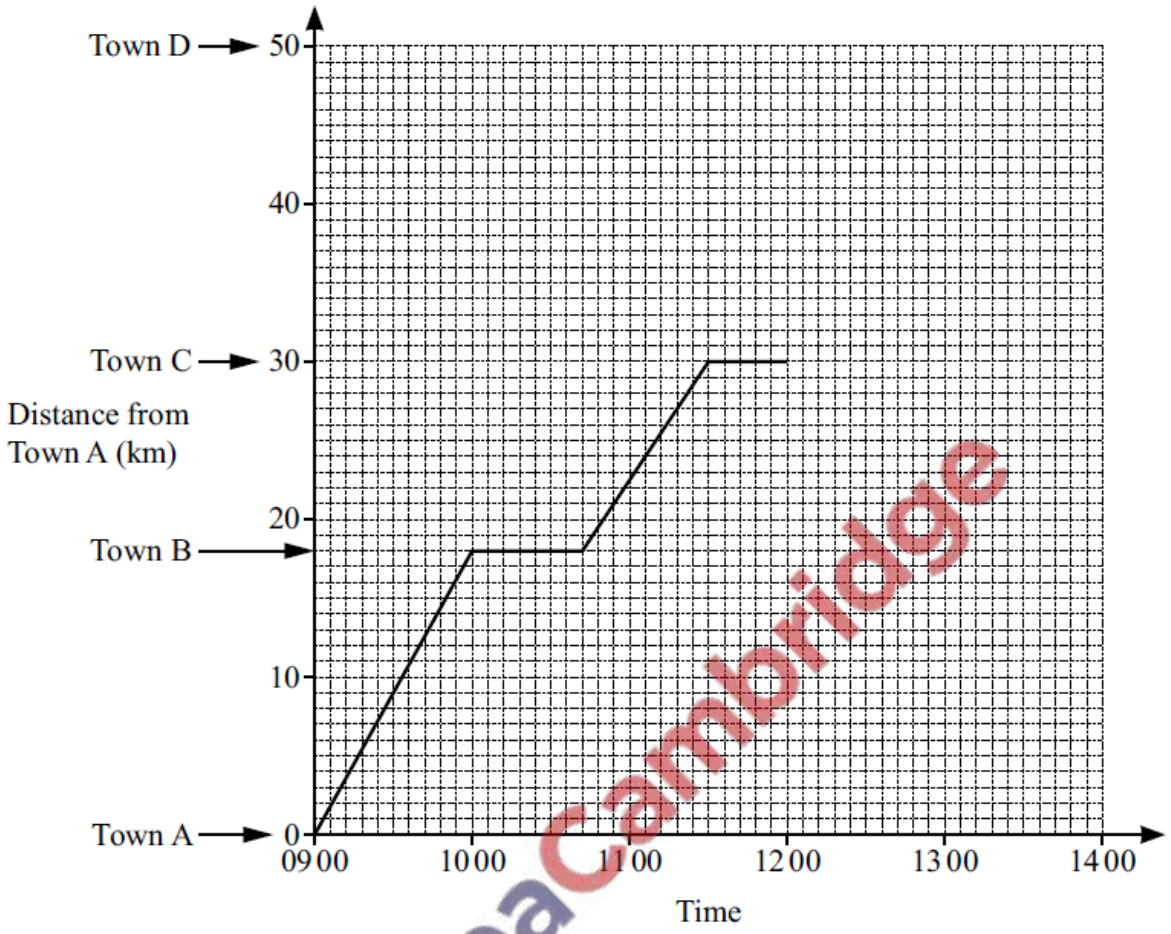
$$W = \frac{t}{2}(7t - 4)$$

Find the value of W when $t = 18$.

$W =$ ..... [2]

14. Specimen/2025/Paper_03/No.13

Jason leaves Town A at 09 00 and cycles to Town C.
The travel graph shows Jason's journey.



(a) Find Jason's average speed, in kilometres per hour, from Town A to Town B.

..... km/h [1]

(b) Jason leaves Town C at 12 00.
Jason continues to Town D at a constant speed of 15 kilometres per hour.

(i) Calculate the time Jason takes to travel from Town C to Town D.
Give your answer in hours and minutes.

..... h ..... min [2]

(ii) On the travel graph, complete Jason's journey. [1]

(c) Find the total time, in minutes, that Jason stopped between Town A and Town D.

..... min [1]

(d) Calculate Jason's overall average speed, in kilometres per hour, from Town A to Town D.

..... km/h [3]

(e) Lisa leaves Town C at 11 00 and arrives at Town A at 13 42.
Lisa cycles at a constant speed on the same road as Jason, without stopping.

(i) Draw a line on the travel graph to show Lisa's journey. [2]

(ii) Find the distance from Town A when Lisa and Jason pass each other.

..... km [1]

15. Specimen/2025/Paper_03/No.18

(a) These are the first five terms of a sequence.

$$7 \quad a \quad b \quad c \quad 31$$

In the sequence, the same number is added each time to obtain the next term.

Find the value of each of the terms a, b and c.

$a =$ .....

$b =$ .....

$c =$ .....

[2]

(b) These are the first five terms of another sequence.

$$4 \quad 11 \quad 18 \quad 25 \quad 32$$

(i) Find the nth term of the sequence.

..... [2]

(ii) Show that 361 is a term in the sequence.

[2]

16. Specimen/2025/Paper_04/No.1

Write down the integer values of x that satisfy the inequality $-2 \leqslant x < 2$.

..... [2]

17. Specimen/2025/Paper_04/No.3

Simplify.

$$(x^8y^7) \div (x^{-1}y^3)$$

..... [2]

18. Specimen/2025/Paper_04/No.4

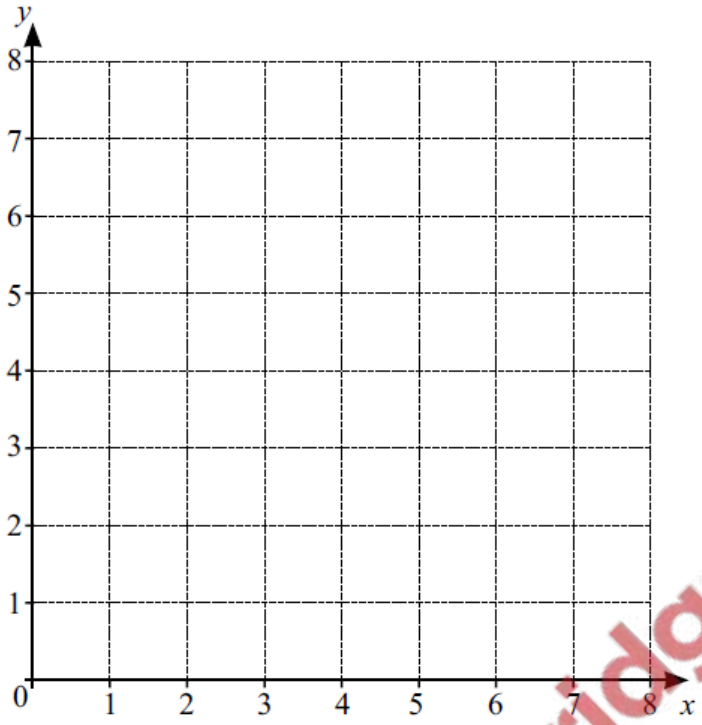
$$f(x) = 3x - 5$$

The domain of $f(x)$ is $\{-3, 0, 2\}$.

Find the range of $f(x)$.

{ ..... } [2]

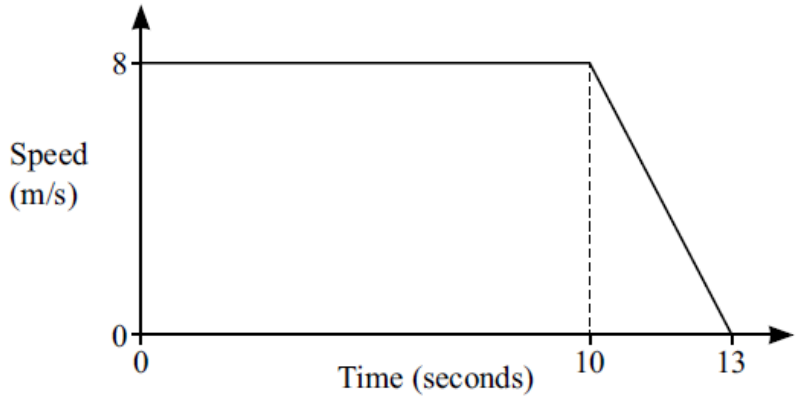
19. Specimen/2025/Paper_04/No.8



(a) On the grid, draw the lines $y = x$ and $x + y = 7$. [3]

(b) Region R satisfies the three inequalities $y \geqslant 0$, $y \leqslant x$ and $x + y \geqslant 7$.
On the grid, label the region R. [1]

20. Specimen/2025/Paper_04/No.9



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SCALE

The diagram shows the speed–time graph of part of a car journey.

(a) Find the deceleration of the car between 10 and 13 seconds.

..... m/s^2 [1]

(b) Calculate the total distance travelled during the 13 seconds.

..... m [2]

21. Specimen/2025/Paper_04/No.10

Factorise.

$2x + 6 - 3xy - 9y$

..... [2]

22. Specimen/2025/Paper_04/No.15

$$y = \sqrt{u^2 x}$$

(a) Find the value of y when $u = 7$ and $x = 25$.

$y =$ ..... [2]

(b) Rearrange the formula to write x in terms of u and y.

$x =$ ..... [2]

23. Specimen/2025/Paper_04/No.18

Solve.

$$\frac{3y}{2y-1} = \frac{3}{4}$$

$y =$ ..... [3]

24. Specimen/2025/Paper_04/No.20

$y = 2x^k + ux^7$ and $\frac{dy}{dx} = 18x^{k-1} + 21x^6$

Find the value of k and the value of u.

$k =$ .....

$u =$ .....

[2]

25. Specimen/2025/Paper_04/No.21

Simplify.

$$\frac{5p^2 - 20p}{2p^2 - 32}$$

..... [3]

26. Specimen/2025/Paper_04/No.24

The straight line $y = 2x + 1$ intersects the curve $y = x^2 + 3x - 4$ at the points A and B.

Find the coordinates of A and B.
Give your answers correct to 2 decimal places.

A (..... , ...)

B (..... , ...)
[6]