

General Algebra

Difficulty: Hard

Question Paper 3

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	General Algebra
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 3

Time allowed: 108 minutes

Score: /94

Percentage: /100

Grade Boundaries:

CIE IGCSE Maths (0580)

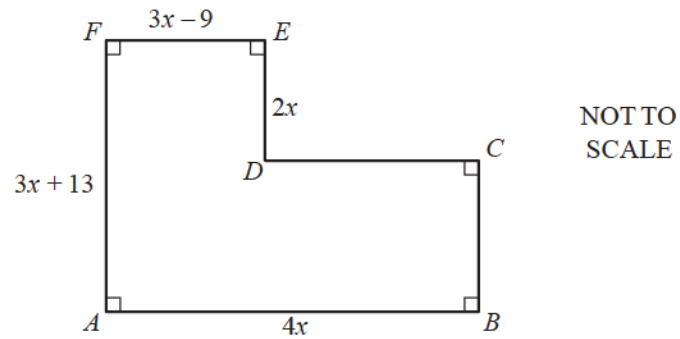
A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

Question 1

- (a) The area of shape $ABCDEF$ is 24 cm^2 .
All lengths are in centimetres.



- (i) Show that $5x^2 + 17x - 12 = 0$.

[3]

- (ii) Solve, by factorising, the equation $5x^2 + 17x - 12 = 0$.
You must show all your working.

[3]

- (b) Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned}3x - 2y &= 23 \\ -4x - y &= -5\end{aligned}$$

[3]

- (c) Solve the equation.

$$\frac{2(t+3)}{t} - \frac{t}{t+3} = 1$$

[5]

Question 2

- (a) Jamil, Kiera and Luther collect badges.
Jamil has x badges.
Kiera has 12 badges more than Jamil.
Luther has 3 times as many badges as Kiera.
Altogether they have 123 badges.

Form an equation and solve it to find the value of x . [3]

- (b) Find the integer values of t which satisfy the inequalities. [3]

$$4t + 7 < 39 \leq 7t + 2$$

- (c) Solve the following equations. [3]

(i) $\frac{21 - x}{x + 3} = 4$

(ii) $3x^2 + 7x - 5 = 0$

Show all your working and give your answers correct to 2 decimal places.

[4]

Question 3

(a) Make x the subject of the formula.

$$A - x = \frac{xt}{t} \quad [4]$$

(b) Find the value of a and the value of b when $x^2 - 16x + a = (x + b)^2$. [3]

(c) Write as a single fraction in its simplest form.

$$\frac{6}{x - 4} - \frac{5}{3x - 2} \quad [3]$$

Question 4

On the first part of a journey, Alan drove a distance of x km and his car used 6 litres of fuel.

The rate of fuel used by his car was $\frac{600}{x}$ litres per 100 km.

(a) Alan then drove another $(x + 20)$ km and his car used another 6 litres of fuel.

- (i) Write down an expression, in terms of x , for the rate of fuel used by his car on this part of the journey.

Give your answer in litres per 100 km.

[1]

- (ii) On this part of the journey the rate of fuel used by the car **decreased** by 1.5 litres per 100 km.

Show that $x^2 + 20x - 8000 = 0$.

Answer(a)(ii)

[4]

(b) Solve the equation $x^2 + 20x - 8000 = 0$.

[3]

(c) Find the rate of fuel used by Alan's car for the complete journey.
Give your answer in litres per 100 km.

[2]

Question 5

(a) Expand and simplify.

$$3x(x - 2) - 2x(3x - 5) \quad [3]$$

(b) Factorise the following completely.

(i) $6w + 3wy - 4x - 2xy$ [2]

(ii) $4x^2 - 25y^2$ [2]

(c) Simplify.

$$\left(\frac{16}{9x^4}\right)^{\frac{3}{2}} \quad [2]$$

(d) n is an integer.

(i) Explain why $2n - 1$ is an odd number. [1]

(ii) Write down, in terms of n , the next odd number after $2n - 1$. [1]

(iii) Show that the difference between the squares of two consecutive odd numbers is a multiple of 8. [3]

Question 6

(a) Factorise $121y^2 - m^2$. [2]

(b) Write as a single fraction in its simplest form.

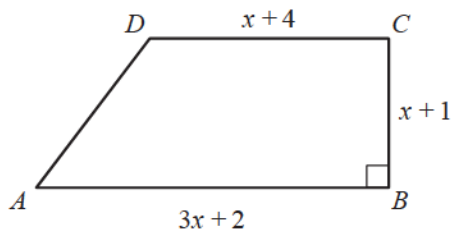
$$\frac{4}{3x - 5} + \frac{x + 2}{x - 1} \quad [3]$$

(c) Solve the equation.

$$3x^2 + 2x - 7 = 0$$

Show all your working and give your answers correct to 2 decimal places. [4]

(d) In this part, all lengths are in centimetres.



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$ABCD$ is a trapezium with area 15 cm^2 .

(i) Show that $2x^2 + 5x - 12 = 0$.

[3]

(ii) Solve the equation $2x^2 + 5x - 12 = 0$.

[3]

(iii) Write down the length of AB .

[1]

Question 7

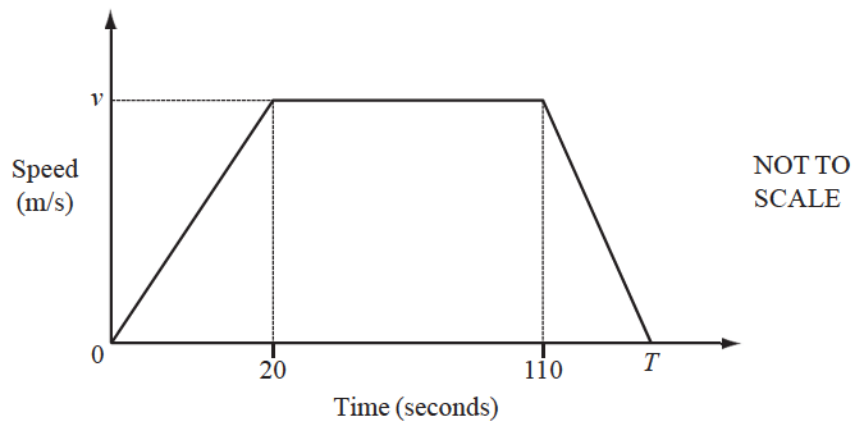
(a) Rearrange the formula $v^2 = u^2 - 2as$ to make u the subject. [2]

(b) Chuck cycles along Skyline Drive.
He cycles 60 km at an average speed of x km/h.
He then cycles a further 45 km at an average speed of $(x + 4)$ km/h.
His total journey time is 6 hours.

(i) Write down an equation in x and show that it simplifies to $2x^2 - 27x - 80 = 0$. [4]

(ii) Solve $2x^2 - 27x - 80 = 0$ to find the value of x . [3]

(c) The diagram shows the speed-time graph for a car travelling along a road for T seconds.



To begin with the car accelerated at 0.75 m/s^2 for 20 seconds to reach a speed of $v \text{ m/s}$.

(i) Show that the speed, v , of the car is 15 m/s . [1]

(ii) The total distance travelled is **1.8 kilometres**.

Calculate the total time, T , of the journey. [4]

(d) Asma runs 22 kilometres, correct to the nearest kilometre.
She takes $2\frac{1}{2}$ hours, correct to the nearest halfhour.

Calculate the upper bound of Asma's speed. [3]