General Algebra
Difficulty: Medium

Question Paper 2

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	General Algebra
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 2

Time allowed: **86 minutes**

Score: **/75**

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%

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The distance a train travels on a journey is 600 km.

(a) Write down an expression, in terms of x, for the average speed of the train when

(i) the journey takes x hours, [1]

(ii) the journey takes $(x + 1)$ hours. [1]

(b) The difference between the average speeds in **part(a)(i)** and **part(a)(ii)** is 20 km/h.

(i) Show that $x^2 + x - 30 = 0$. [3]

(ii) Find the average speed of the train for the journey in **part(a)(ii)**.
Show all your working. [4]

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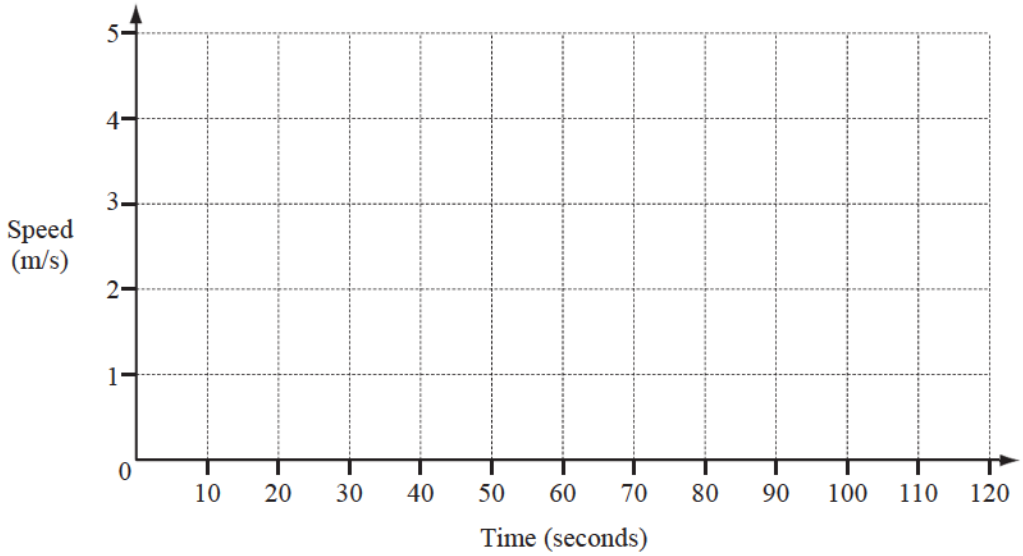
Emily cycles along a path for 2 minutes.
She starts from rest and accelerates at a constant rate until she reaches a speed of 5 m/s after 40 seconds.
She continues cycling at 5 m/s for 60 seconds.
She then decelerates at a constant rate until she stops after a further 20 seconds.

(a) On the grid, draw a speed-time graph to show Emily's journey. [2]



(b) Find Emily's acceleration. [1]

(c) Calculate Emily's average speed for the journey. [4]

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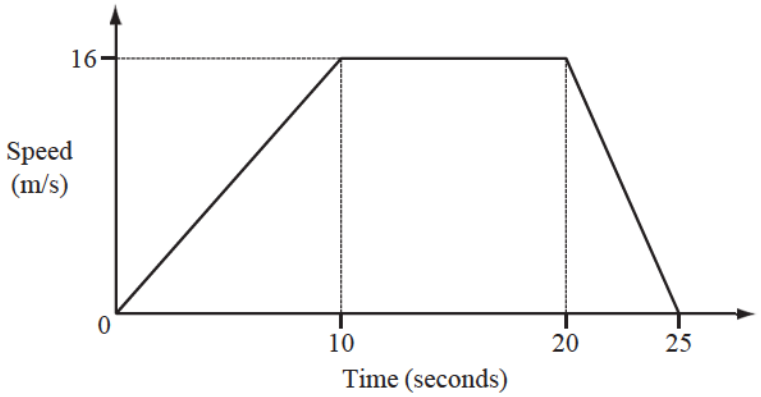
(a) Rearrange $s = ut + \frac{1}{2}at^2$ to make a the subject. [3]

(b) The formula $v = u + at$ can be used to calculate the speed, v, of a car.

$u = 15$, $a = 2$ and $t = 8$, each correct to the nearest integer.

Calculate the upper bound of the speed v. [3]

(c) The diagram shows the speed-time graph for a car travelling between two sets of traffic lights.



(i) Calculate the deceleration of the car for the last 5 seconds of the journey. [1]

(ii) Calculate the average speed of the car between the two sets of traffic lights. [4]

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Paul buys a number of large sacks of fertiliser costing \$$x$ each.

He spends \$27.

(a) Write down, in terms of x, an expression for the number of large sacks which Paul buys. [1]

(b) Rula buys a number of small sacks of fertiliser.
Each small sack costs \$2 less than a large sack.
Rula spends \$25.

Write down, in terms of x, an expression for the number of small sacks which Rula buys. [1]

(c) Rula buys 4 more sacks than Paul.
Write down an equation in x and show that it simplifies to $2x^2 - 3x - 27 = 0$. [4]

(d) Solve $2x^2 - 3x - 27 = 0$. [3]

(e) Calculate the number of sacks which Paul buys. [1]

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(a) (i) Factorise completely the expression $4x^2 - 18x - 10$. [3]

(ii) Solve $4x^2 - 18x - 10 = 0$. [1]

(b) Solve the equation $2x^2 - 7x - 10 = 0$.

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

(c) Write $\frac{6}{3x-1} - \frac{2}{x-2}$ as a single fraction in its simplest form. [3]

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(a) A parallelogram has base $(2x - 1)$ metres and height $(4x - 7)$ metres.
The area of the parallelogram is $1\ \text{m}^2$.

(i) Show that $4x^2 - 9x + 3 = 0$. [3]

(ii) Solve the equation $4x^2 - 9x + 3 = 0$.

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

(iii) Calculate the height of the parallelogram. [1]

(b) (i) Factorise $x^2 - 16$. [1]

(ii) Solve the equation $\dfrac{2x+3}{x-4} + \dfrac{x+40}{x^2-16} = 2$. [4]

(a) Simplify [2]

(i) $(2x^2y^3)^3$,

(ii) $\left(\frac{27}{x^6}\right)^{-\frac{1}{3}}$. [3]

(b) Multiply out and simplify.

$(3x - 2y)(2x + 5y)$ [3]

(c) Make h the subject of

(i) $V = \pi r^3 + 2\pi r^2 h$, [2]

(ii) $V = \sqrt{3h}$. [2]

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

$\frac{x}{2} + \frac{5x}{3} - \frac{7x}{4}$ [2]