General Algebra Difficulty: Hard

Question Paper 2

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

Time allowed: 123 minutes

Score: /107

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%

(a)

xcm

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The perimeter of the rectangle is 80 cm.
The area of the rectangle is A cm^2.

(i) Show that $x^2 - 40x + A = 0$.

[3]

(ii) When $A = 300$, solve, by factorising, the equation $x^2 - 40x + A = 0$.

[3]

(iii) When $A = 200$, solve, by using the quadratic formula, the equation $x^2 - 40x + A = 0$.
Show all your working and give your answers correct to 2 decimal places.

[4]

2

(b) A car completes a 200 km journey with an average speed of x km/h.
The car completes the return journey of 200 km with an average speed of $(x + 10)$ km/h.

(i) Show that the difference between the time taken for each of the two journeys is $\dfrac{2000}{x(x + 10)}$ hours.

[3]

(ii) Find the difference between the time taken for each of the two journeys when $x = 80$.
Give your answer in **minutes** and **seconds**.

[3]

Mr Chan flies from London to Los Angeles, a distance of 8800 km.
The flight takes 11 hours and 10 minutes.

(a) (i)   His plane leaves London at 0935 local time.
           The local time in Los Angeles is 8 hours behind the time in London.

           Calculate the local time when the plane arrives in Los Angeles.   [2]

     (ii) Work out the average speed of the plane in km/h.   [2]

(b) There are three types of tickets, economy, business and first class.
     The price of these tickets is in the ratio   economy : business : first class = 2 : 5 : 9.

     (i)   The price of a business ticket is $2350.

           Calculate the price of a first class ticket.   [2]

     (ii) Work out the price of an economy ticket as a percentage of the price of a first class ticket.
                                                                                               [1]

(c) The price of a business ticket for the same journey with another airline is $2240.

     (i)   The price of a first class ticket is 70% more than a business ticket.

           Calculate the price of this first class ticket.   [2]

(ii) The price of a business ticket is 180% **more** than an economy ticket.

Calculate the price of this economy ticket. [3]

(d) Mr Chan hires a car in Los Angeles.
The charges are shown below.

Car Hire

$28.00 per day plus $6.50 per day insurance.

$1.25 for every kilometre travelled after the first 800 km.
The first 800 km are included in the price.

Mr Chan hired the car for 12 days and paid $826.50 .

(i) Find the number of kilometres Mr Chan travelled in this car. [4]

(ii) The car used fuel at an average rate of 1 litre for every 10 km travelled.
Fuel costs $1.30 per litre.

Calculate the cost of the fuel used by the car during the 12 days. [2]

(a) Solve the inequality.

$$5x - 3 > 9$$

[2]

(b) Factorise completely.

    (i) $xy - 18 + 3y - 6x$

[2]

    (ii) $8x^2 - 72y^2$

[3]

(c)   Make r the subject of the formula.

$$p + 5 = \frac{1 - 2r}{r}$$

[4]

Alfonso runs 10 km at an average speed of x km/h.
The next day he runs 12 km at an average speed of $(x - 1)$ km/h.

The time taken for the 10 km run is 30 minutes less than the time taken for the 12 km run.

(a) (i) Write down an equation in x and show that it simplifies to $x^2 - 5x - 20 = 0$. [4]

(ii) Use the quadratic formula to solve the equation $x^2 - 5x - 20 = 0$.
Show your working and give your answers correct to 2 decimal places. [4]

(iii) Find the time that Alfonso takes to complete the 12 km run.
Give your answer in hours and minutes correct to the nearest minute. [2]

(b) A cheetah runs for 60 seconds.
The diagram shows the speed-time graph.

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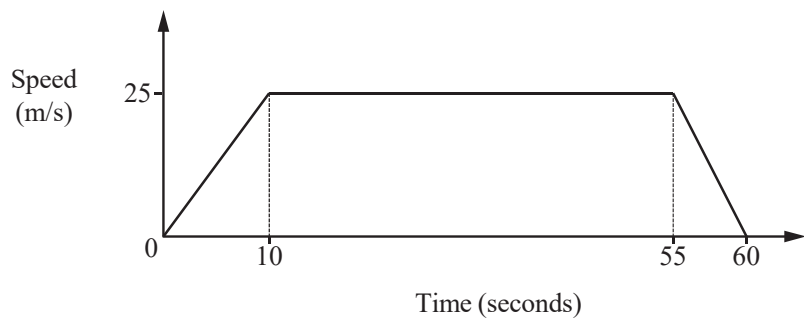
(i) Work out the acceleration of the cheetah during the first 10 seconds. [1]

(ii) Calculate the distance travelled by the cheetah. [3]

(a) y is directly proportional to the positive square root of $(x + 2)$.
When $x = 7$, $y = 9$.

Find y when $x = 23$. [3]

(b) Simplify.

$$\frac{x^2 + 12x + 36}{x^2 + 4x - 12}$$ [5]

(c)
$$W = \sqrt{\frac{X-a}{a}}$$

Make a the subject of the formula. [5]

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

$$\frac{x-2}{x+1} - \frac{x+3}{x-1}$$

[5]

(a) Calculate $2^{0.7}$.

[1]

(b) Find the value of x in each of the following.

   (i) $2^x = 128$

[1]

   (ii) $2^x \times 2^9 = 2^{13}$

[1]

   (iii) $2^9 \div 2^x = 4$
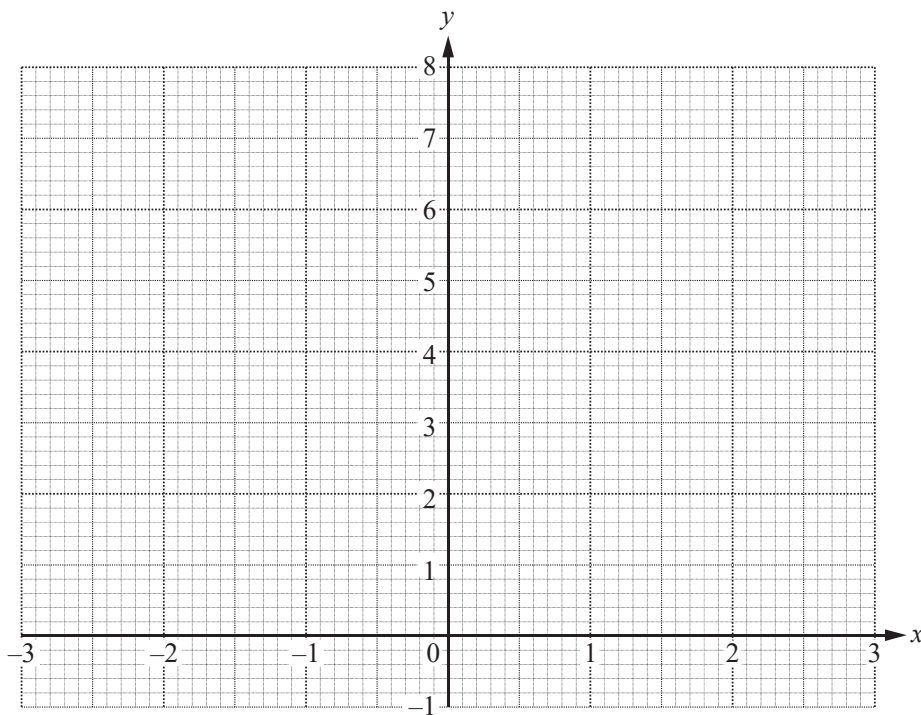
[1]

   (iv) $2^x = \sqrt[3]{2}$

[1]

(c)   (i)   Complete this table of values for $y = 2^x$.

x	−3	−2	−1	0	1	2	3
y	0.125		0.5		2	4	8

[2]

(ii)   On the grid, draw the graph of $y = 2^x$ for $-3 \leqslant x \leqslant 3$.

[4]

(iii)   Use your graph to solve $2^x = 5$.   [1]

(iv)   Find the equation of the line joining the points (1, 2) and (3, 8).   [3]

(v)   By drawing a suitable line on your graph, solve $2^x - 2 - x = 0$.   [2]

(a) Factorise $x^2 - 3x - 10$. [2]

(b) (i) Show that $\dfrac{x+2}{x+1} + \dfrac{3}{x} = 3$ simplifies to $2x^2 - 2x - 3 = 0$.

[3]

Answer(b)(i)

(ii) Solve $2x^2 - 2x - 3 = 0$.
Give your answers correct to 3 decimal places.
Show all your working. [4]

(c) Simplify $\dfrac{2x+3}{x+2} - \dfrac{x}{x+1}$ [4]