General Algebra Difficulty: Medium

Question Paper 3

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

Time allowed: 107 minutes

Score: /93

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 train travels from Paris to Milan.

(a) The train departs from Paris at 2028 and the journey takes 9 hours 10 minutes.

    (i) Find the time the train arrives in Milan. [1]

    (ii) The distance between Paris and Milan is 850 km.

       Calculate the average speed of the train. [2]

(b) The total number of passengers on the train is 640.

    (i) 160 passengers have tickets which cost $255 each.
        330 passengers have tickets which cost $190 each.
        150 passengers have tickets which cost $180 each.

       Calculate the mean cost of a ticket. [3]

(ii) There are men, women and children on the train in the ratio

men : women : children = 4 : 3 : 1 .

Show that the number of women on the train is 240. [2]

(iii) 240 is an increase of 60% on the number of women on the train the previous day.

Calculate the number of women on the train the previous day. [3]

(c) The length of the train is 210 m.
It passes through a station of length 340 m, at a speed of 180 km/h.

Calculate the number of seconds the train takes to pass completely through the station. [3]

3

(a) Rice costs \$$x$ per kilogram. Potatoes
cost \$$(x + 1)$ per kilogram.
The total cost of $12\,kg$ of rice and $7\,kg$ of potatoes is \$31.70.

Find the cost of 1 kg of rice. [3]

(b) The cost of a small bottle of juice is \$$y$.
The cost of a large bottle of juice is \$$(y + 1)$.
When Catriona spends \$36 on small bottles only, she receives 25 more bottles than when she
spends \$36 on large bottles only.

(i) Show that $25y^2 + 25y - 36 = 0$. [3]

(ii) Factorise $25y^2 + 25y - 36$. [2]

(iii) Solve the equation $25y^2 + 25y - 36 = 0$. [1]

(iv) Find the total cost of 1 small bottle of juice and 1 large bottle of juice. [1]

(a) Find the integer values for x which satisfy the inequality $-3 < 2x - 1 \leqslant 6$. [3]

(b) Simplify $\dfrac{x^2 + 3x - 10}{x^2 - 25}$. [4]

(c) (i) Show that $\dfrac{5}{x-3} + \dfrac{2}{x+1} = 3$ can be simplified to $3x^2 - 13x - 8 = 0$. [3]

(ii) Solve the equation $3x^2 - 13x - 8 = 0$.

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

(a) The cost of a bottle of juice is 5 cents more than the cost of a bottle of water.
Mohini buys 3 bottles of water and 6 bottles of juice.
The total cost is $5.25.

Find the cost of a bottle of water.
Give your answer in cents. [4]

(b) The cost of a biscuit is x cents. The
cost of a cake is $(x + 3)$ cents.
The number of biscuits Roshni can buy for 72 cents is 2 more than the number of cakes she can
buy for 72 cents.

(i) Show that $x^2 + 3x - 108 = 0$. [3]

(ii) Solve the equation $x^2 + 3x - 108 = 0$. [3]
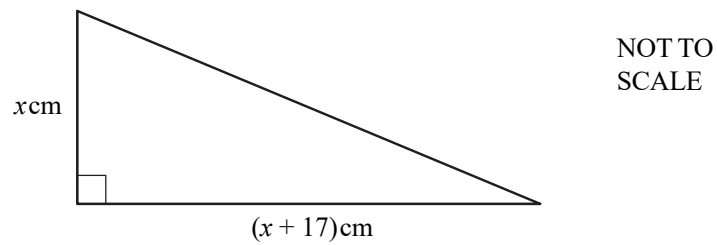
(iii) Find the total cost of 2 biscuits and 1 cake. [1]

(a) Solve $\quad 9 < 3n + 6 \leqslant 21 \quad$ for integer values of n. [3]

(b) Factorise completely.

(i) $2x^2 + 10xy$ [2]

(ii) $3a^2 - 12b^2$ [3]

(c)

NOT TO SCALE

The area of this triangle is 84 cm^2.

(i) Show that $x^2 + 17x - 168 = 0$. [2]

(ii) Factorise $x^2 + 17x - 168$. [2]
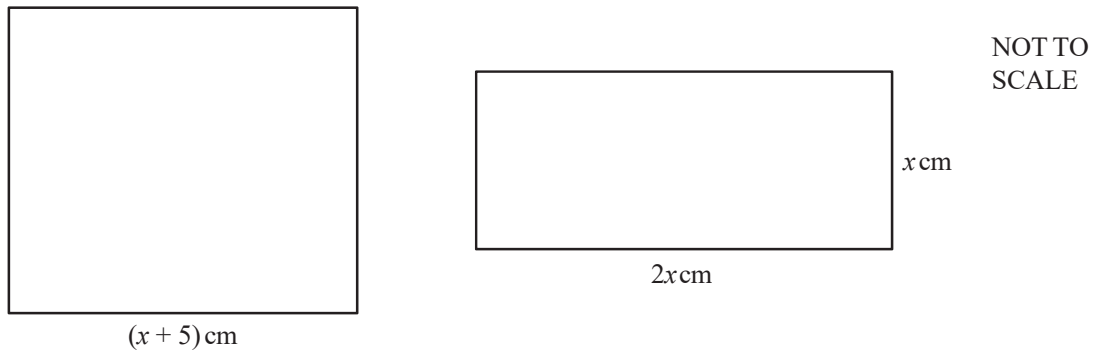
(iii) Solve $x^2 + 17x - 168 = 0$. [1]

7

(d) Solve

$$\frac{15 - x}{2} = 3 - 2x.$$ [3]

(e)   Solve $2x^2 - 5x - 6 = 0$.

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

NOT TO SCALE

x cm

$2x$ cm

$(x + 5)$ cm

The diagram shows a square of side $(x + 5)$ cm and a rectangle which measures $2x$ cm by x cm.

The area of the square is 1 cm^2 more than the area of the rectangle.

(a) Show that $x^2 - 10x - 24 = 0$.   [3]
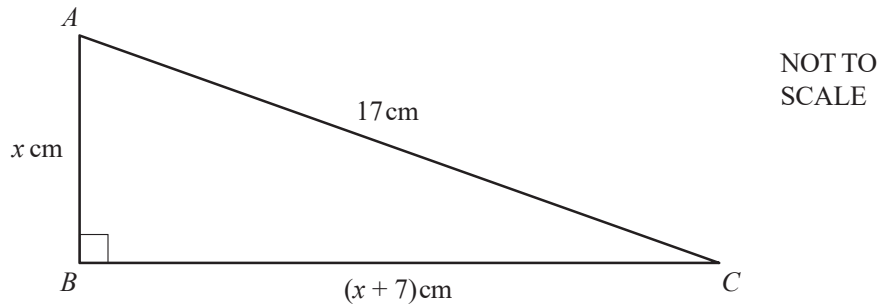
(b) Find the value of x. [3]

(c) Calculate the acute angle between the diagonals of the rectangle. [3]

(a)

In the right-angled triangle ABC, $AB = x$ cm, $BC = (x + 7)$ cm and $AC = 17$ cm.
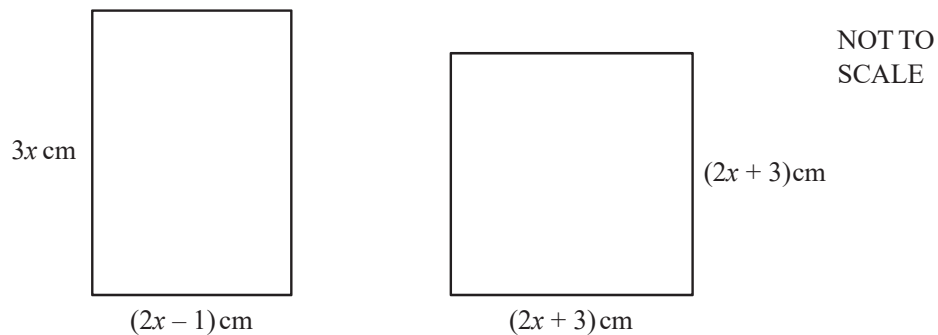
(i) Show that $x^2 + 7x - 120 = 0$. [3]

(ii) Factorise $x^2 + 7x - 120$. [2]

(iii) Write down the solutions of $x^2 + 7x - 120 = 0$. [1]

(iv) Write down the length of BC.

[1]

(b)

NOT TO SCALE

$3x$ cm

$(2x - 1)$ cm

$(2x + 3)$ cm

$(2x + 3)$ cm

The rectangle and the square shown in the diagram above have the same area.

(i) Show that $2x^2 - 15x - 9 = 0$. [3]

(ii) Solve the equation $2x^2 - 15x - 9 = 0$.
    Show all your working and give your answers correct to 2 decimal places. [4]

(iii) Calculate the perimeter of the square. [1]