Quadratic Equations

Question Paper 13

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Algebra and Graphs
Sub-Topic	Solving Equations – Quadratic Equations
Booklet	Question Paper 13

Time Allowed: **90 minutes**

Score: **/75**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1 **(a)** The cost of 1 kg of tomatoes is $\$x$ and the cost of 1 kg of onions is $\$y$.

Ian pays a total of \$10.70 for 10 kg of tomatoes and 4 kg of onions.

Jao pays a total of \$10.10 for 8 kg of tomatoes and 6 kg of onions.

Write down simultaneous equations and solve them to find x and y.

Answer(a) $x =$ .....

$y =$ ..... [6]

(b) Solve $2x^2 - 5x - 8 = 0$.

Give your answers correct to 2 decimal places.
Show all your working.

Answer(b) $x =$ ..... or $x =$ ..... [4]

2 **(a)** Expand the brackets and simplify.

$$x(x+3)+4x(x-1)$$

Answer(a) ..... [2]

(b) Simplify $(3x^3)^3$.

Answer(b) ..... [2]

(c) Factorise the following completely.

(i) $7x^7 + 14x^{14}$

Answer(c)(i) ..... [2]

(ii) $xy + xw + 2ay + 2aw$

Answer(c)(ii) ..... [2]

(iii) $4x^2 - 49$

Answer(c)(iii) ..... [1]

(d) Solve the equation.

$$2x^2 + 5x + 1 = 0$$

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

Answer(d) $x =$ ..... or $x =$ ..... [4]

3 **(a)** $f(x) = 1 - 2x$.

(i) Find f(-5).

Answer(a)(i) ..... [1]

(ii) $g(x) = 3x - 2$.

Find $gf(x)$. Simplify your answer.

Answer(a)(ii) ..... [2]

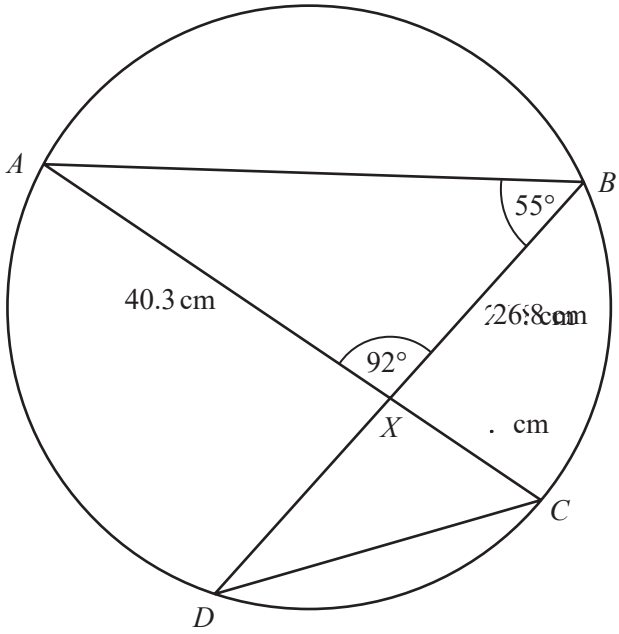
(b) $h(x) = x^2 - 5x - 11$.

Solve $h(x) = 0$.

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

Answer(b) $x =$ ..... or $x =$ ..... [4]

4 **(a**



NOT TO SCALE

A, *B*, *C* and *D* lie on a circle.

AC and *BD* intersect at *X*.

Angle *ABX* = 55° and angle *AXB* = 92°.

BX = 26.8 cm, *AX* = 40.3 cm and *XC* = 20.1 cm.

(i) Calculate the area of triangle *AXB*.
You must show your working. [2]

(ii) Calculate the length of *AB*.
You must show your working. [3]

(iii) Write down the size of angle *ACD*. Give a reason for your answer. [2]

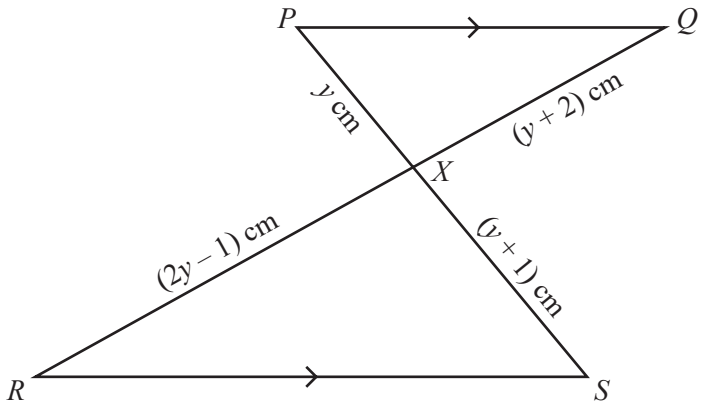
(iv) Find the size of angle *BDC*. [1

(v) Write down the geometrical word which completes the statement

"Triangle *AXB* is ——— to triangle *DXC*." [1]

(vi) Calculate the length of *XD*.
You must show your working. [2]

(b)



NOT TO SCALE

In the diagram PQ is parallel to RS.

PS and QR intersect at X.

$PX = y$ cm, $QX = (y + 2)$ cm, $RX = (2y – 1)$ cm and $SX = (y + 1)$ cm.

(i) Show that $y^2 – 4y – 2 = 0$. [3]

(ii) Solve the equation $y^2 – 4y – 2 = 0$.

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

(iii) Write down the length of RX. [1

5 Solve the equations

(a) $0.2x - 3 = 0.5x$,

Answer(a) $x =$ ..... [2]

(b) $2x^2 - 11x + 12 = 0$.

Answer(b) $x =$ ..... or $x =$ ..... [3]

6 **Showing all your working**, solve

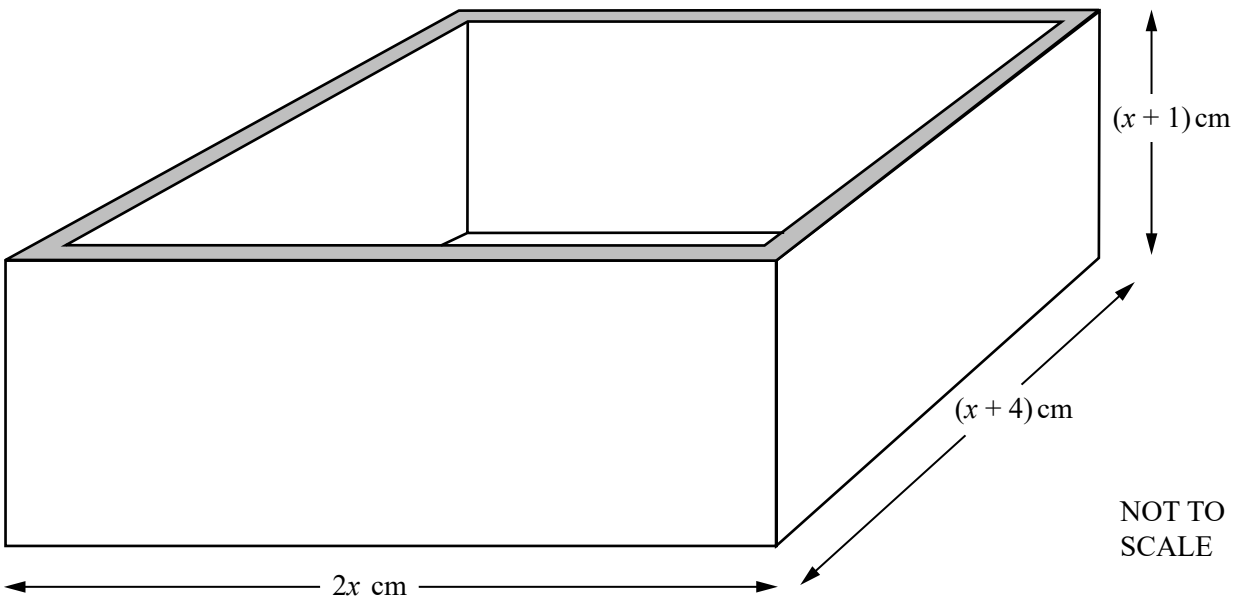
(a) $\frac{5x}{2} - 9 =$

Answer(a) $x =$ ..... [2]

(b) $x^2 + 12x + 3 = 0$, giving your answers correct to 1 decimal place.

Answer(b) $x =$ ..... or $x =$ ..... [4]

7



A rectangular-based **open** box has **external** dimensions of $2x$ cm, $(x + 4)$ cm and $(x + 1)$ cm.

(a) **(i)** Write down the volume of a cuboid with these dimensions. [1]

(ii) Expand and simplify your answer. [1]

(b) The box is made from wood 1 cm thick.

(i) Write down the **internal** dimensions of the box in terms of x. [3]

(ii) Find the volume of the **inside** of the box and show that the volume of the wood is $8x^2 + 12x$ cubic centimetres. [3]

(c) The volume of the wood is 1980 cm^3.

(i) Show that $2x^2 + 3x - 495 = 0$ and solve this equation. [5]

(ii) Write down the **external** dimensions of the box. [2]