

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

B280A

**MATHEMATICS C
(GRADUATED ASSESSMENT)**

MODULE M10 – SECTION A

THURSDAY 21 JANUARY 2010: Afternoon

DURATION: 30 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the Question Paper

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Geometrical instruments

Tracing paper (optional)

WARNING

**No calculator can be used for
Section A of this paper.**

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully and make sure that you know what you have to do before starting your answer.**
- **Show your working. Marks may be given for a correct method even if the answer is incorrect.**
- **Answer ALL the questions.**
- **Write your answer to each question in the space provided, however additional paper may be used if necessary.**

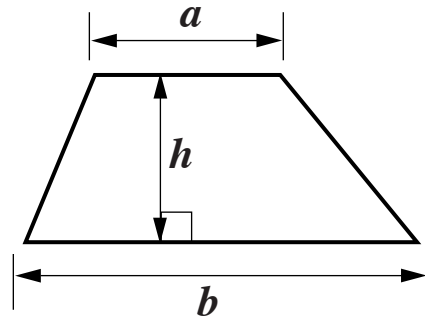
INFORMATION FOR CANDIDATES

- **The number of marks is given in brackets [] at the end of each question or part question.**
- **The total number of marks for this Section is 25.**

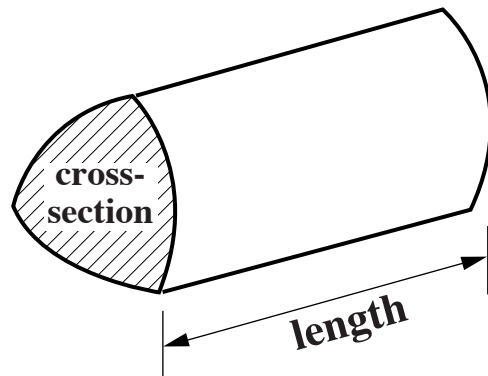
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FORMULAE SHEET

Area of trapezium = $\frac{1}{2}(a + b)h$



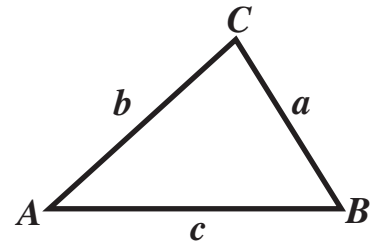
Volume of prism =
(area of cross-section) \times length



In any triangle ABC

Sine rule
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

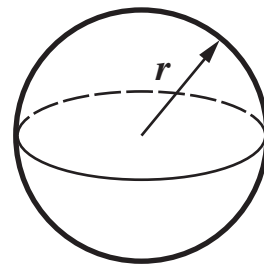
Cosine rule
$$a^2 = b^2 + c^2 - 2bc \cos A$$



Area of triangle = $\frac{1}{2} ab \sin C$

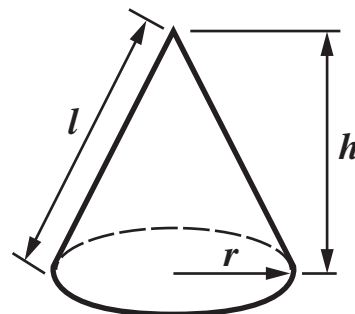
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$

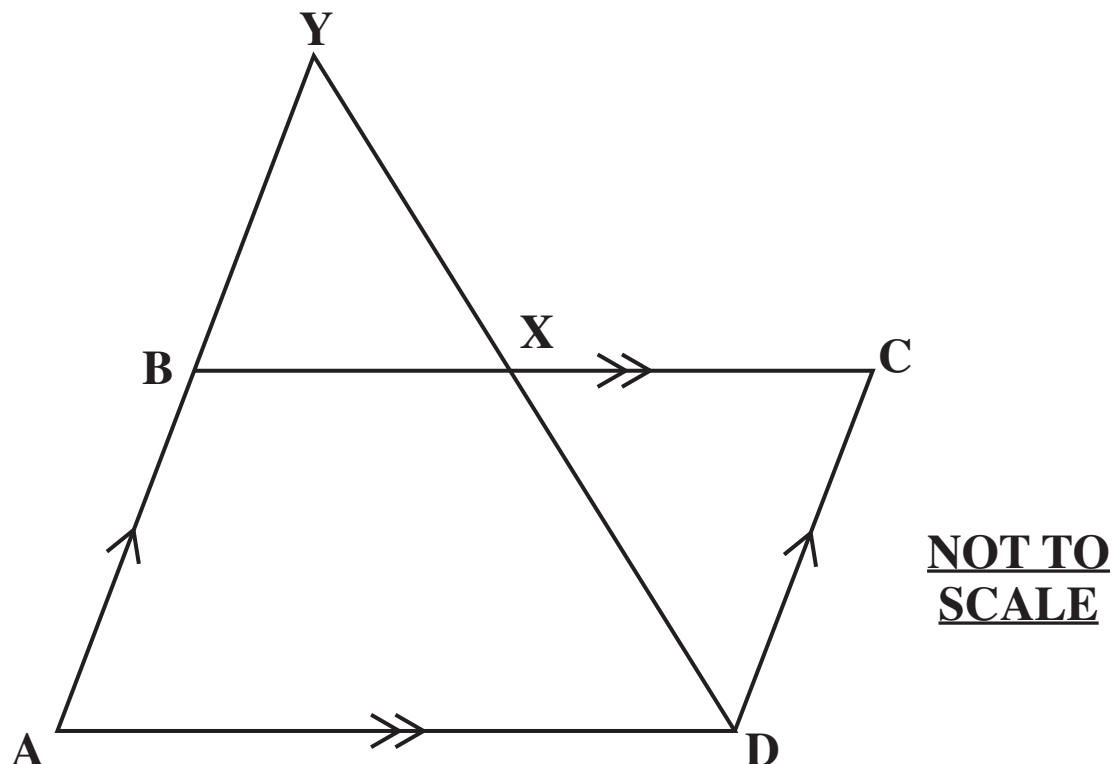


The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

- 1 **ABCD is a parallelogram.**
X is the midpoint of BC.
The lines through AB and DX meet at Y.



Complete this proof to show that triangle BXY is congruent to triangle CXD.

Statement

BX = XC

**so triangles BXY and CXD
are congruent**

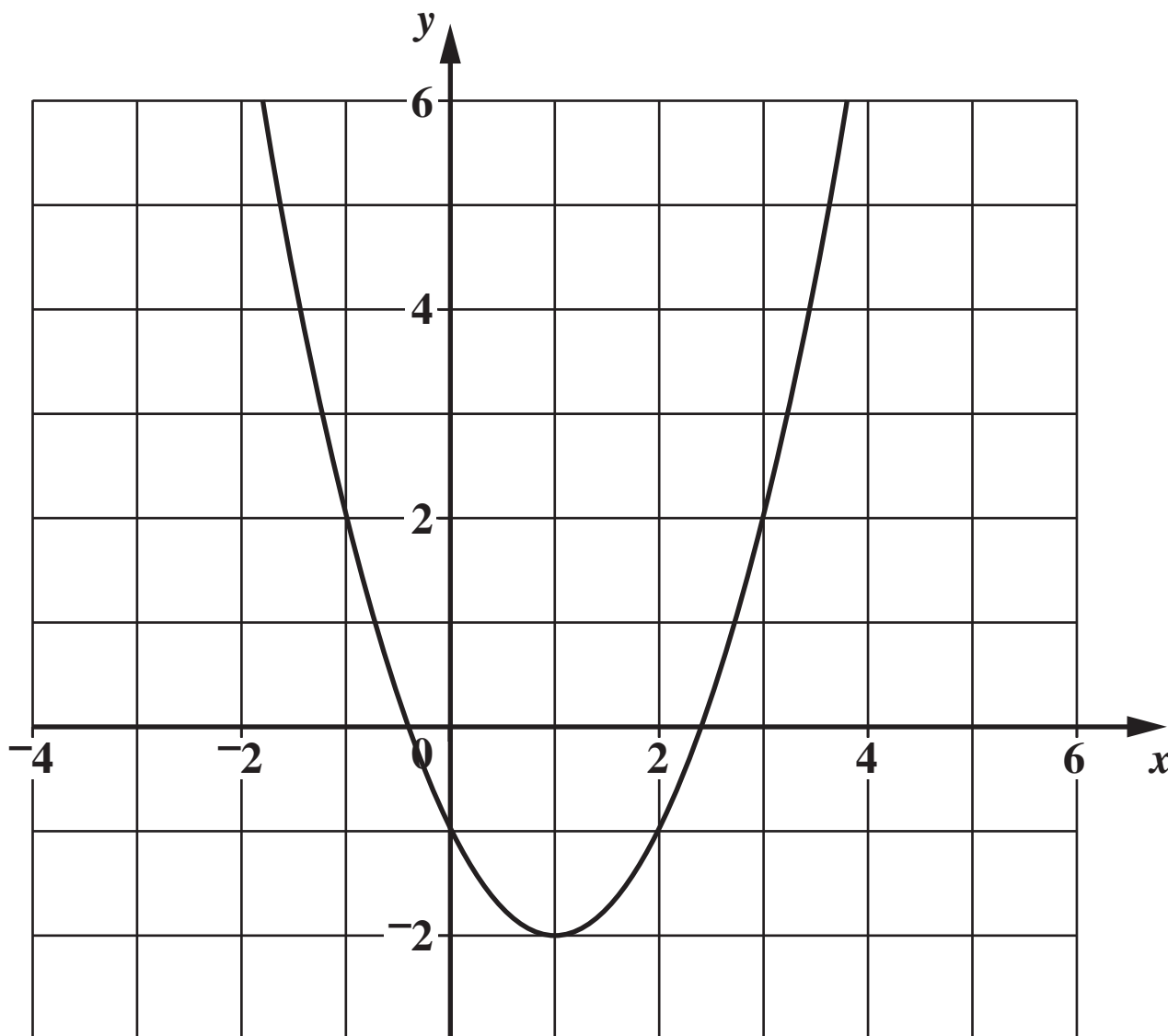
Reason

X is the midpoint of BC

[3 marks]

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2 This is the graph of $y = x^2 - 2x - 1$.



(a) Draw a suitable straight line on the graph to solve this equation.

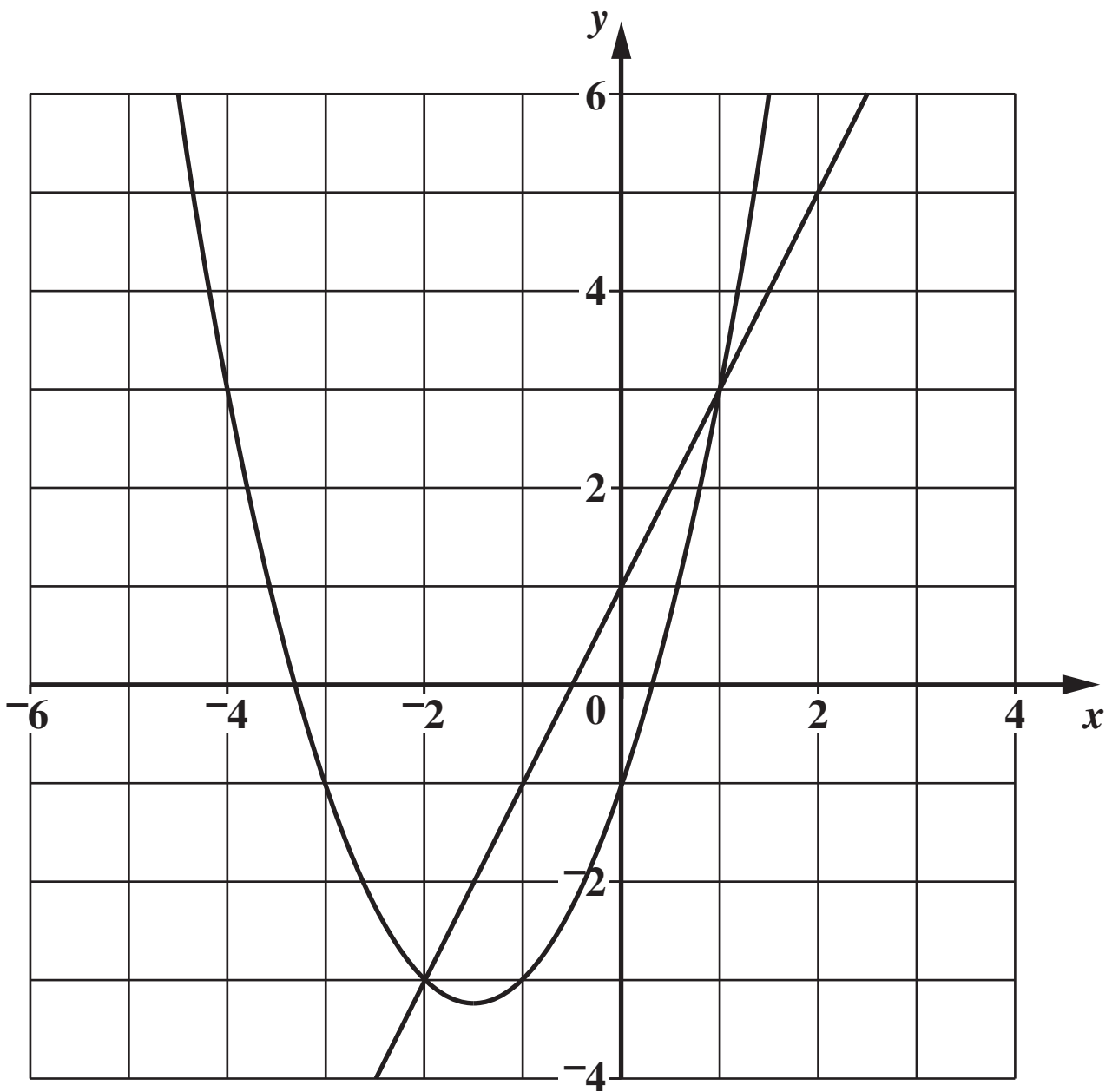
$$x^2 - 2x - 1 = 2 - x$$

Write down your solutions.

[3 marks]

(a) _____ and _____

(b) This grid shows the graphs of $y = x^2 + 3x - 1$ and $y = 2x + 1$.



The points of intersection of the two graphs give the solutions of one of the equations below.

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

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

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

$$x^2 + x = -2$$

Put a ring round the correct equation.
[1 mark]

3 (a) Expand and simplify.

$$(2 - \sqrt{3})^2$$

Write your answer in the form $a - b\sqrt{3}$ where a and b are integers.

[2 marks]

(a) _____

(b) Work out.

$$9^{-\frac{3}{2}}$$

[3 marks]

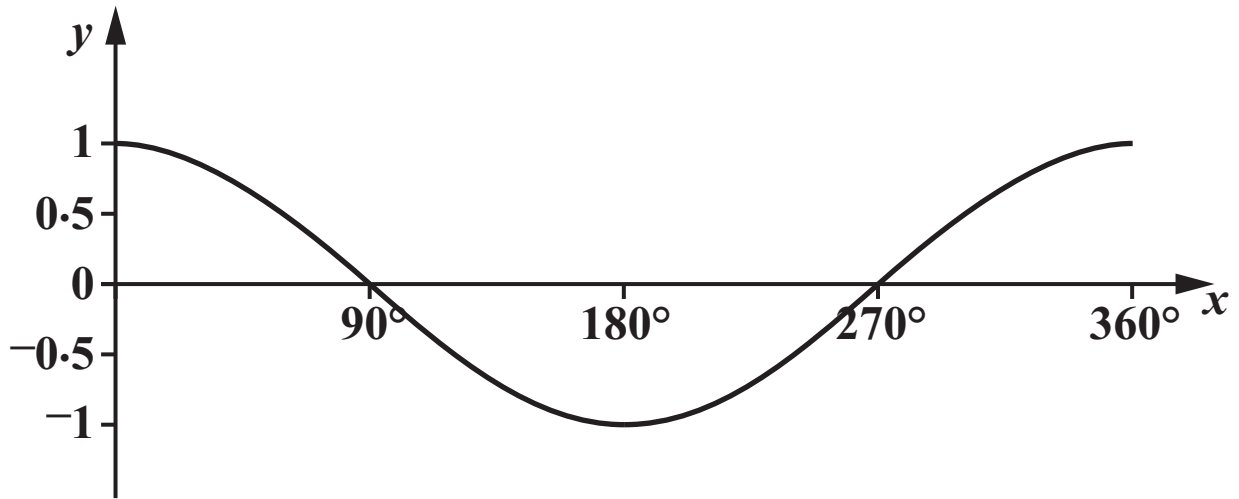
(b) _____

4 Find as a single fraction.

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

Give your answer as simply as possible.
[3 marks]

5 This is the graph of $y = \cos x$ for $0^\circ \leq x \leq 360^\circ$.



One of the solutions of the equation $\cos x = -0.3$ is 107° , correct to the nearest degree.

**Find the second solution for $0^\circ \leq x \leq 360^\circ$.
[1 mark]**

o

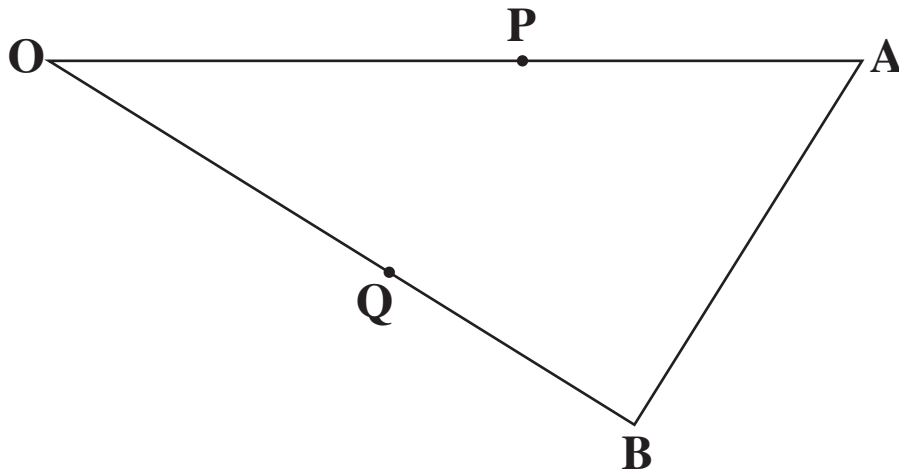
- 6 A bag contains 7 red and 3 yellow counters.
Robert picks a counter at random from the bag and DOES
NOT replace it.
He then picks a second counter at random from the bag.**

What is the probability that he picks one counter of each colour?

[4 marks]

- 7 **OAB** is a triangle.
P is the midpoint of **OA**.
Q is the midpoint of **OB**.

$$\vec{OA} = 4\mathbf{a} \text{ and } \vec{OB} = 4\mathbf{b}.$$



NOT TO SCALE

- (a) Find \vec{AB} in terms of \mathbf{a} and \mathbf{b} .
 [1 mark]

(a) _____

- (b) Show that $\vec{PQ} = 2(\mathbf{b} - \mathbf{a})$.
 [2 marks]

(c) What do your answers to parts (a) and (b) tell you about PQ and AB?
[2 marks]



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