OCR
RECOGNISING ACHIEVEMENT

M10

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT) B280A

MODULE M10 – SECTION A

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:
- Geometrical instruments
- Tracing paper (optional)

Thursday 21 January 2010
Afternoon

Duration: 30 minutes

OCE/10122

B280A

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- 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.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

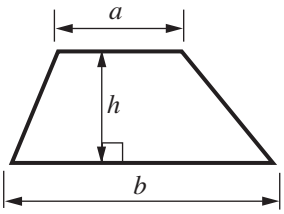
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this Section is **25**.
- This document consists of **12** pages. Any blank pages are indicated.

WARNING

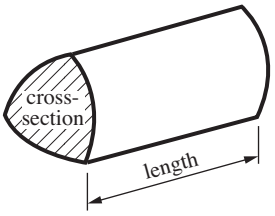
No calculator can be used for Section A of this paper

Formulae Sheet

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



Volume of prism = (area of cross-section) × length

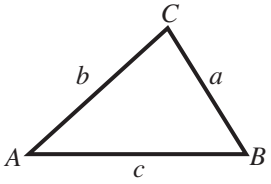


In any triangle *ABC*

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

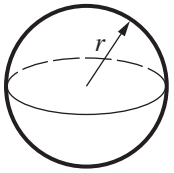
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



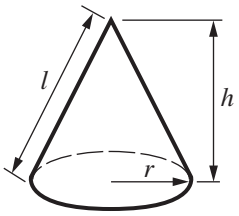
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = πrl



The Quadratic Equation

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

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

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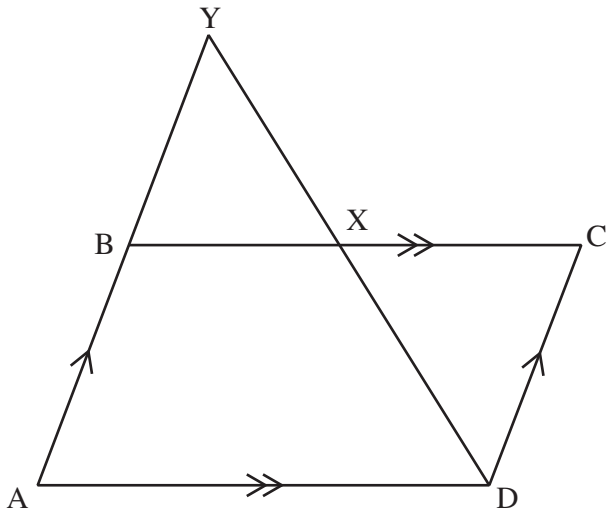


Not to scale

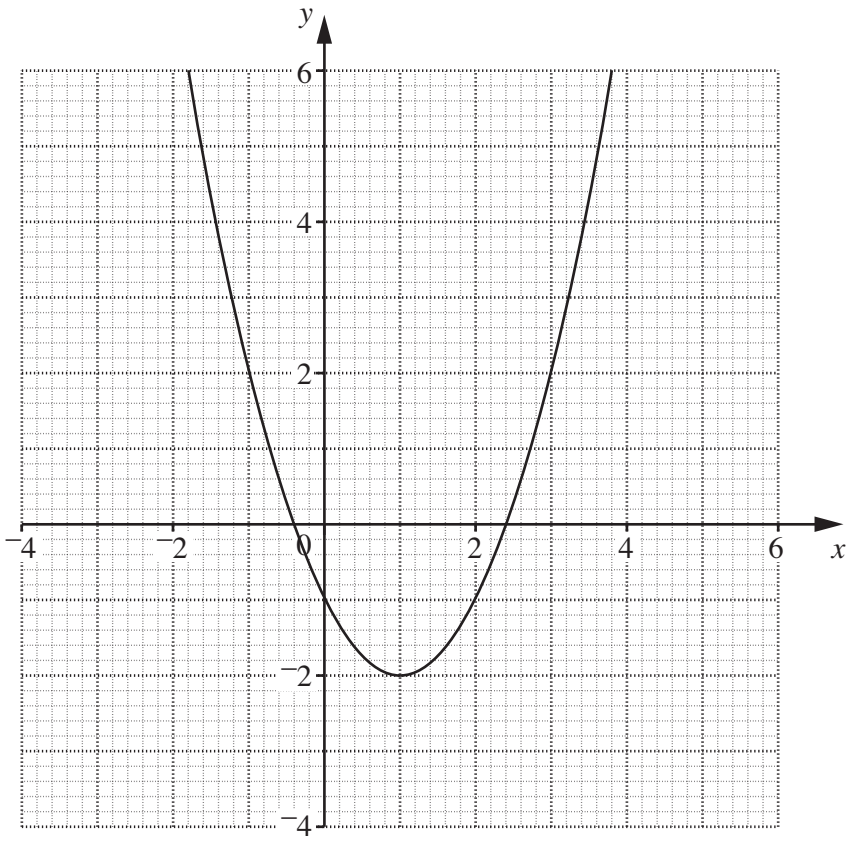
ABCD is a parallelogram.
X is the midpoint of BC.
The lines through AB and DX meet at Y.

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

Statement	Reason
BX = XC	X is the midpoint of BC
.....	.....
.....	.....
so triangles BXY and CXD are congruent	.....

[3]

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



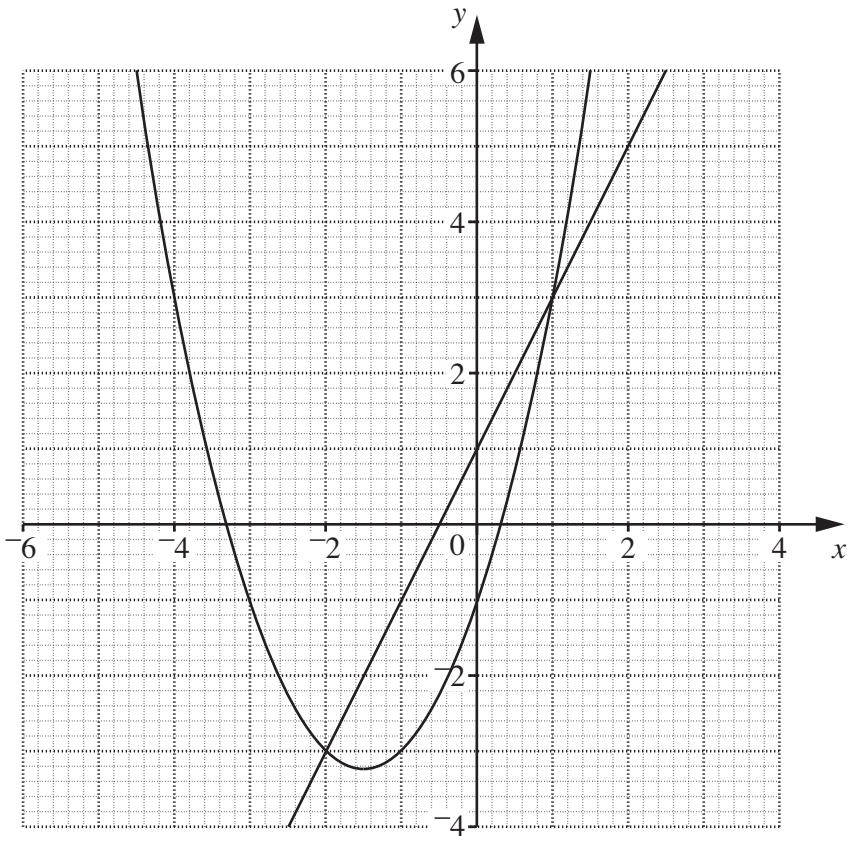
(a) Draw a suitable straight line on the graph to solve this equation.

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

Write down your solutions.

(a) ..... and ..... **[3]**

(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.

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

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

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

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.

(a)..... **[2]**

(b) Work out.

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

(b) ..... **[3]**

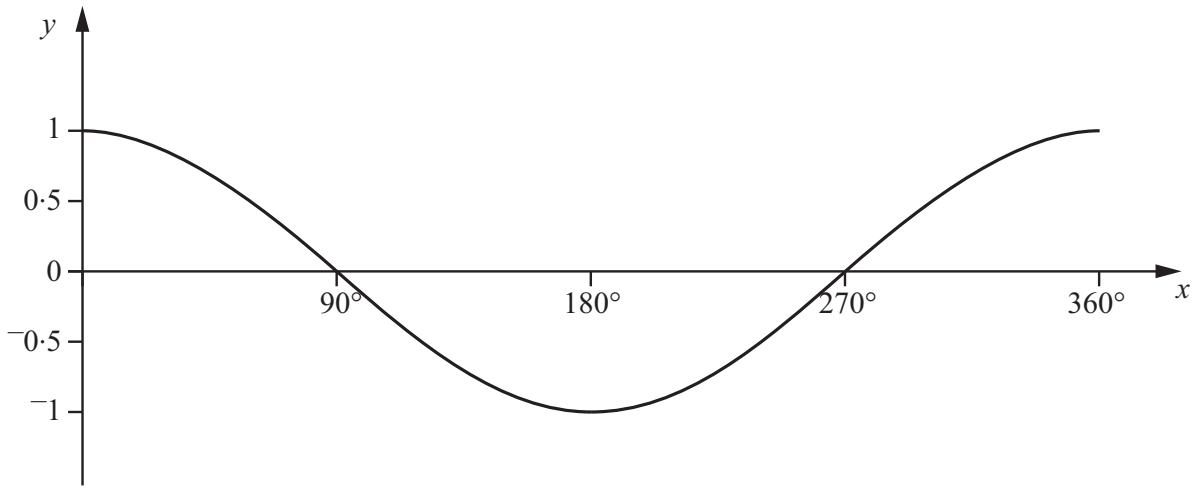
4 Find as a single fraction.

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

Give your answer as simply as possible.

..... **[3]**

5 This is the graph of $y = \cos x$ for $0° \leqslant x \leqslant 360°$.



One of the solutions of the equation $\cos x = -0{\cdot}3$ is 107°, correct to the nearest degree.

Find the second solution for $0° \leqslant x \leqslant 360°$.

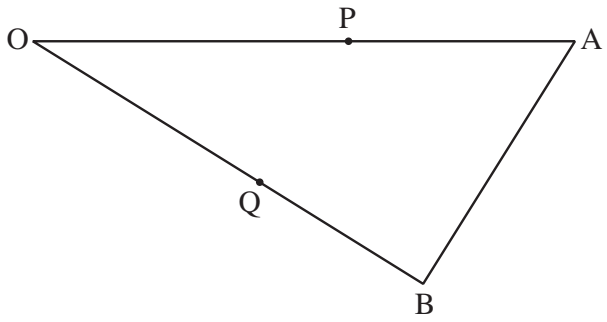
..... ° **[1]**

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]**

7



Not to scale

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

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

(a) Find $\overrightarrow{AB}$ in terms of **a** and **b**.

(a) ..... **[1]**

(b) Show that $\overrightarrow{PQ} = 2(\mathbf{b} - \mathbf{a})$.

.....

.....

..... **[2]**

(c) What do your answers to parts **(a)** and **(b)** tell you about PQ and AB?

.....

..... **[2]**

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