OCR
RECOGNISING ACHIEVEMENT

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Wednesday 11 January 2012 – Morning

GCSE MATHEMATICS C (GRADUATED ASSESSMENT)

B282A Terminal Paper – Section A (Higher Tier)

Candidates answer on the Question Paper.
OCR supplied materials: None
Other materials required: • Geometrical instruments • Tracing paper (optional) • Pie chart scale (optional)

Duration: 1 hour

B282A

Candidate forename		Candidate surname	

Centre number					Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure 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.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

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 **50**.
- This document consists of **12** pages. Any blank pages are indicated.

WARNING

No calculator can be used for Section A of this paper

OCR is an exempt Charity

Turn over
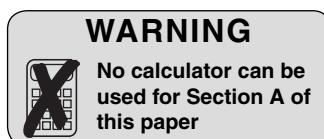
Formulae Sheet

Area of trapezium $= \frac{1}{2}(a + b)h$
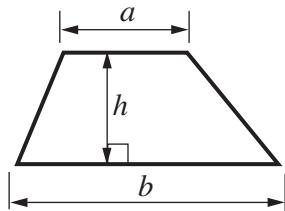
Volume of prism = (area of cross-section) $\times$ length
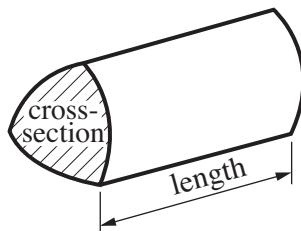
In any triangle ABC

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

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

**Area of triangle** $= \frac{1}{2}ab \sin C$
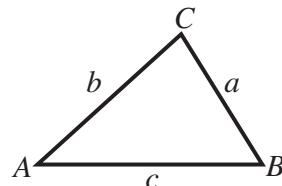
Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$
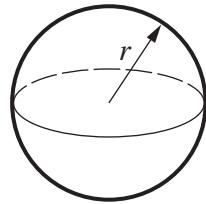
Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$
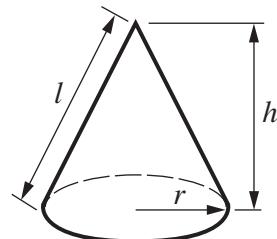
The Quadratic Equation

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

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

PLEASE DO NOT WRITE ON THIS PAGE

1 **(a)** Draw the graph of $y = 4x - 1$ for values of x between $^-3$ and 3.
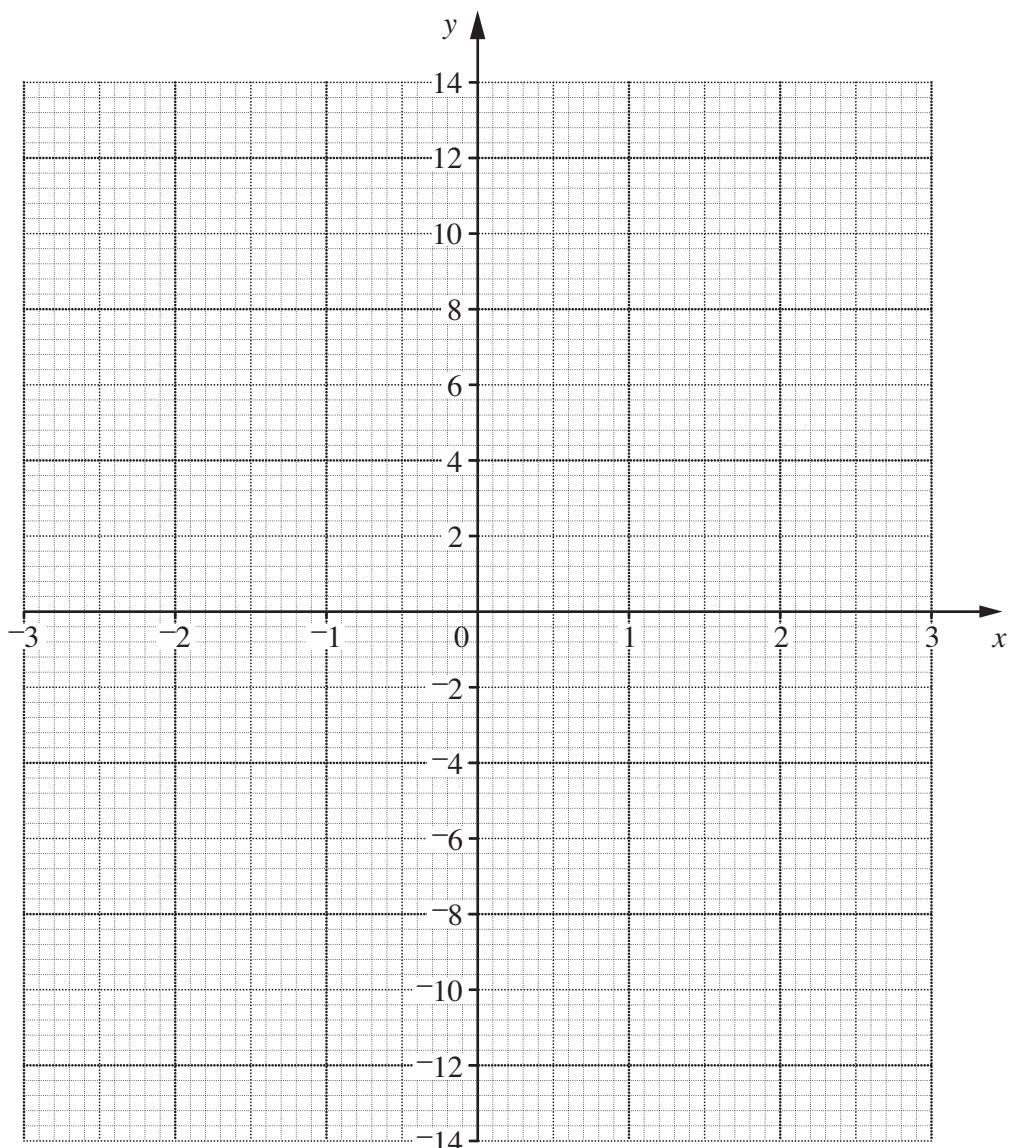
[3]

(b) Use your graph to solve $4x - 1 = 5$.

(b) ....[1]

Turn over

2 Work out.

(a) $\frac{4}{5} - \frac{2}{3}$

(a) ....[2]

(b) $\frac{1}{3} \div \frac{3}{4}$

(b) ....[2]

3 The nth term of a sequence is $4n + 1$.

(a) Work out the first three terms of the sequence.

(a) .... [2]

(b) Is 32 a term in this sequence?
Give a reason for your answer.

.... because ....

....[1]

4 Triangle **L** is drawn on a coordinate grid.
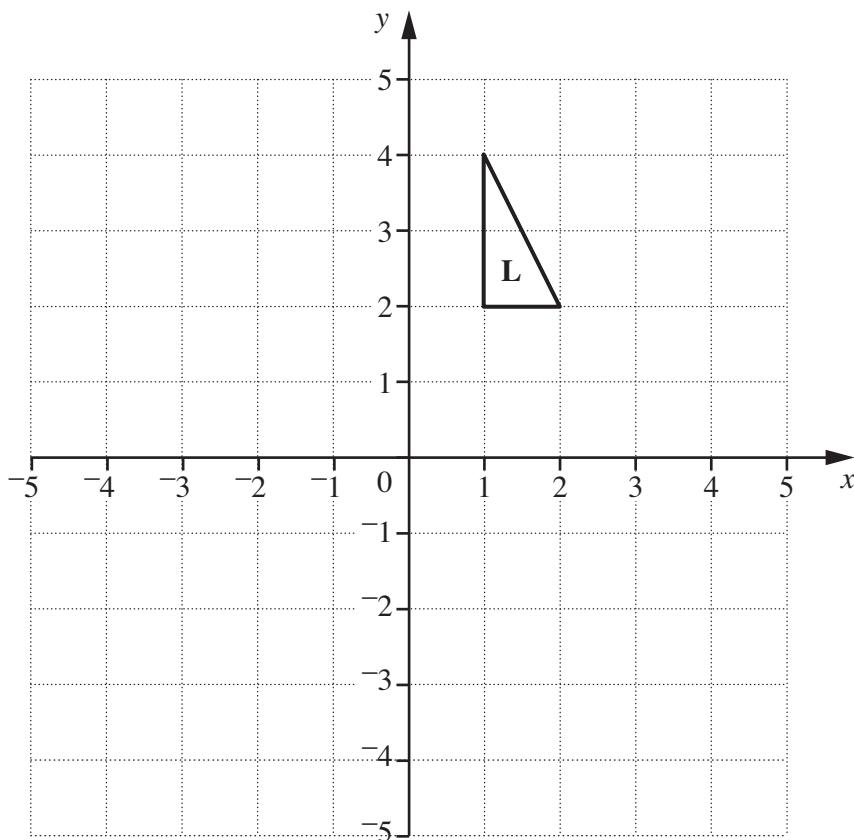
**(a)** Reflect triangle **L** in the line $x = 0$.
Label the image **M**. **[2]**

(b) Rotate **L** through 90° clockwise about (0, 1).
Label the image **N**. **[2]**

(c) Which type of single transformation maps **M** onto **N**?
Choose from this list.

Enlargement   Reflection   Rotation   Translation

(c) ....**[1]**

Turn over

5 All lengths in this question are in centimetres.

$2x + 3$

Not to scale

$x + 5$
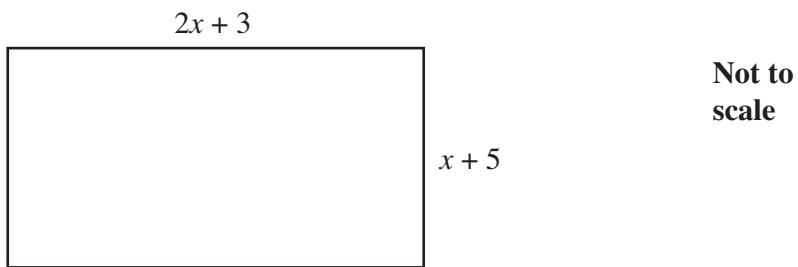
The length of this rectangle is $2x + 3$ and the width is $x + 5$.
The perimeter of the rectangle is 43 cm.

(a) Show that $6x + 16 = 43$.

....

....

....

....**[1]**

(b) Solve the equation $6x + 16 = 43$ to find the value of x.
Use this value to find the length and width of the rectangle.

(b) $x =$ ....

length of rectangle = ... cm

width of rectangle = ... cm **[4]**

6 Mia is playing a game with a red and a blue six-sided dice.

(a) She throws the red dice 200 times. The table shows the distribution of her scores.

Score	1	2	3	4	5	6
Frequency	36	16	30	38	50	30

(i) Use this distribution to estimate the probability of a score of 5 on the red dice. Write your answer as a fraction in its simplest form.

(a)(i) ....[2]

(ii) Explain why it is reasonable to assume that the red dice is biased.

....[1]

(b) Mia tests the blue dice and finds that it is **not** biased. She throws the red dice and the blue dice together.

Work out an estimate of the probability that she scores 5 on the red **and** 5 on the blue dice.

(b) ....[2]

Turn over

7 Solve this inequality.

$$\frac{5x + 4}{2} > x + 11$$

....[4]

8 PQRS is a trapezium.
PQ is parallel to SR.
PS = PR and angle QPR = 55°.
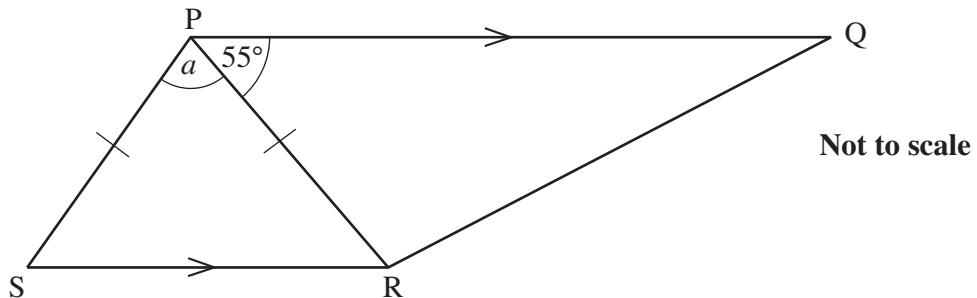
Calculate angle *a*, giving reasons for your answer.

a = ...° because ....

....

....

....

....[3]

9 This table shows the volumes of the five Great Lakes in North America.

Lake	Volume (cubic metres)
Erie	4.8×10^{11}
Huron	3.5×10^{12}
Michigan	4.9×10^{12}
Ontario	1.6×10^{12}
Superior	1.2×10^{13}

(a) Which lake has the largest volume?

(a) ....[1]

(b) What is the total volume of Lake Erie and Lake Ontario?
Give your answer in standard form.

(b) .... cubic metres **[2]**

(c) Another lake in the area, Lake St Clair, has a volume of 3.4×10^{9} cubic metres.

Roughly how many times as large as the volume of Lake St Clair is the volume of Lake Huron?

(c) ....[1]

Turn over

10 (a) Rearrange this equation to make y the subject.

$$x(y - 6) = 2 - 5y$$

(a) ....[4]

(b) Solve by factorising.

$$2x^2 - 9x - 5 = 0$$

(b) ....[3]

11 Squares ABCD and AEFG are drawn on the sides of the right-angled triangle ADE.
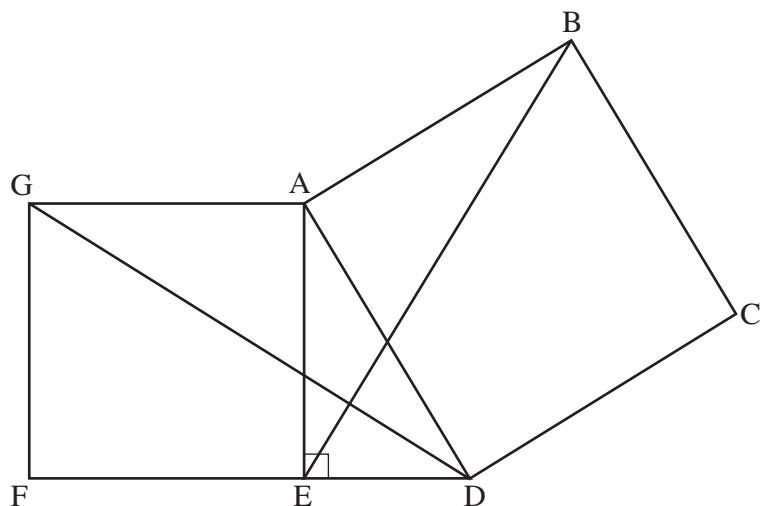
Prove that triangles GAD and EAB are congruent. **[3]**

TURN OVER FOR QUESTION 12

12 The graph of $y = \cos x$ is sketched below for $0° \leqslant x \leqslant 360°$.
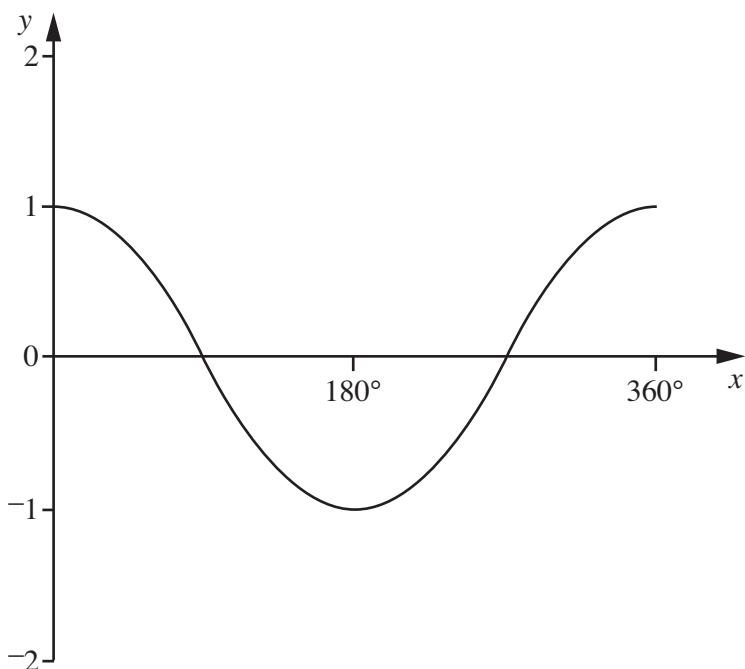
(a) Given that $\cos 70° = 0\cdot34$, find $\cos 110°$.

(a) ....[1]

(b) Using the same axes, sketch the graph of $y = \cos 2x$. **[2]**