Candidate forename		Candidate surname	

Centre number						Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

GCSE

B282A

MATHEMATICS C

(GRADUATED ASSESSMENT)

Terminal Paper – Section A (Higher Tier)

WEDNESDAY 11 JANUARY 2012: Morning
DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Geometrical instruments
Tracing paper (optional)
Pie chart scale (optional)

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

READ INSTRUCTIONS OVERLEAF

DC (SLM/JG) 12MEP01221 57697

INSTRUCTIONS TO CANDIDATES

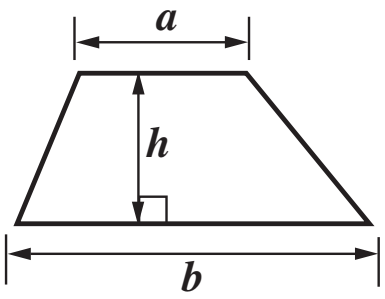
- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you 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).**

INFORMATION FOR CANDIDATES

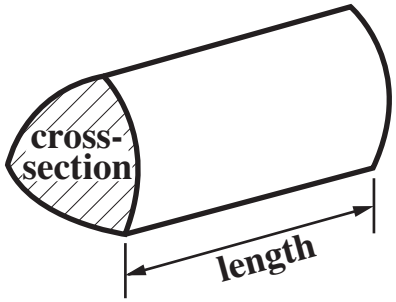
- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **The total number of marks for this Section is 50.**

FORMULAE SHEET

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



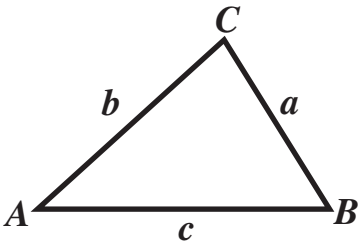
Volume of prism = (area of cross-section) × length



In any triangle ABC

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

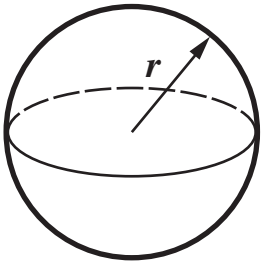
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$



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

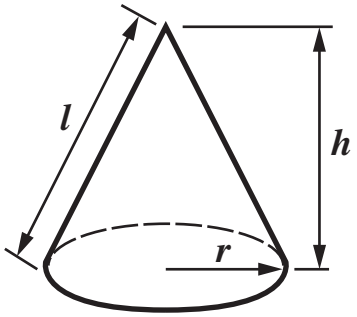
Volume of sphere $= \frac{4}{3}\pi r^3$

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



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

Curved surface area of cone $= \pi rl$

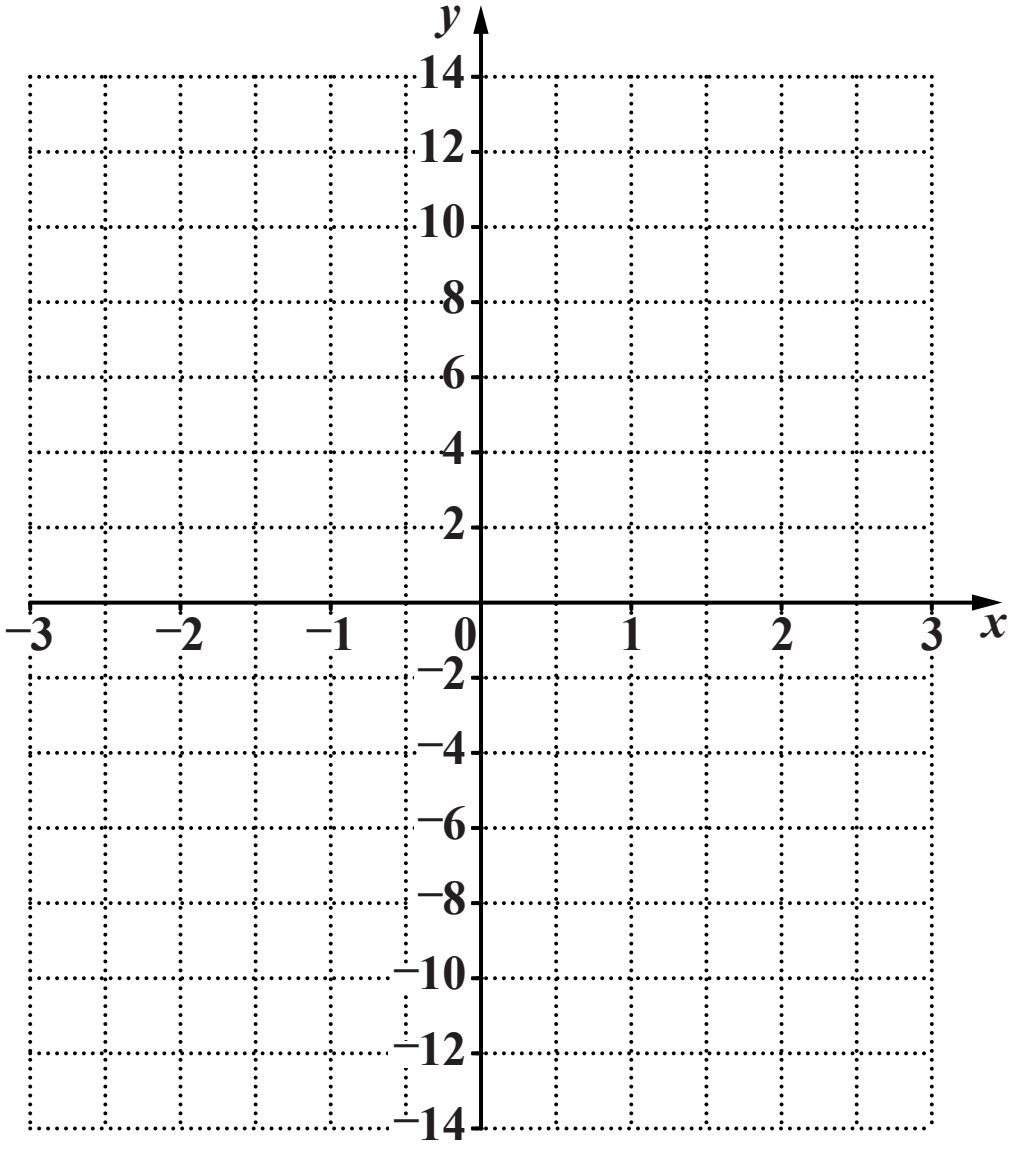


The Quadratic Equation

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 (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]

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.

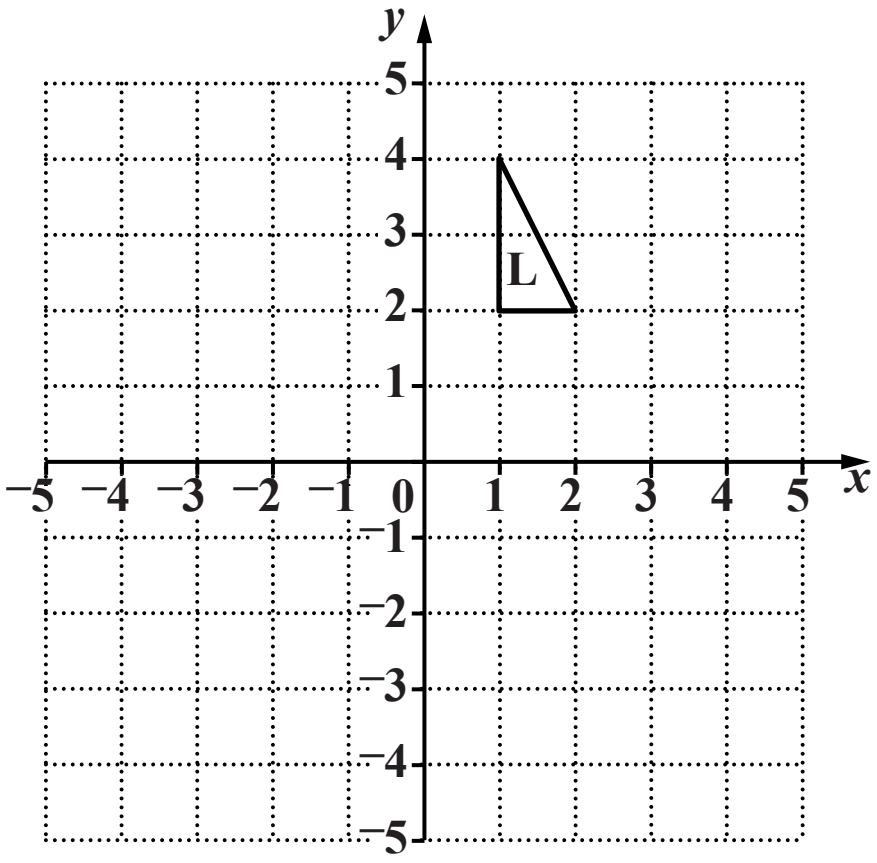
(a) _____ _____ _____ [2]

(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]**

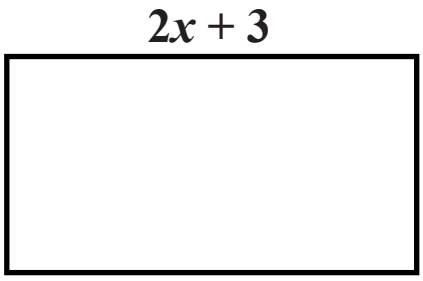
(b) Rotate L through 90° clockwise about (0, 1).
Label the image N. **[2]**

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

Enlargement Reflection Rotation Translation

(c) _____ **[1]**

5 All lengths in this question are in centimetres.



NOT TO SCALE

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.

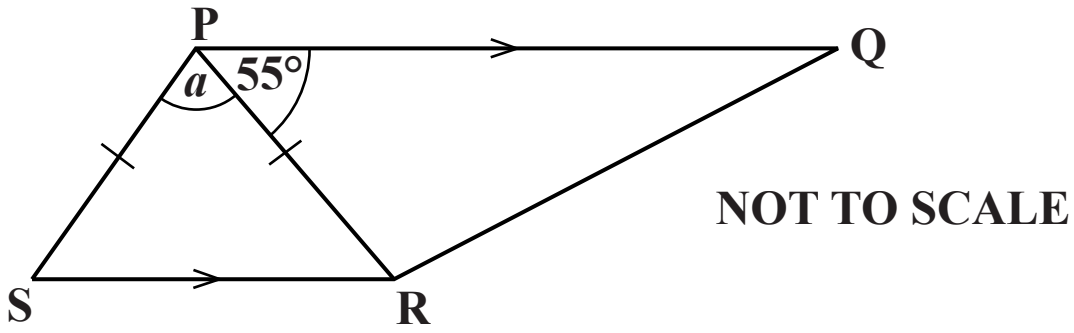
(b) _____ [2]

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	$4{\cdot}8 \times 10^{11}$
Huron	$3{\cdot}5 \times 10^{12}$
Michigan	$4{\cdot}9 \times 10^{12}$
Ontario	$1{\cdot}6 \times 10^{12}$
Superior	$1{\cdot}2 \times 10^{13}$

(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 $3{\cdot}4 \times 10^9$ cubic metres.

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

(c) _____ [1]

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

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

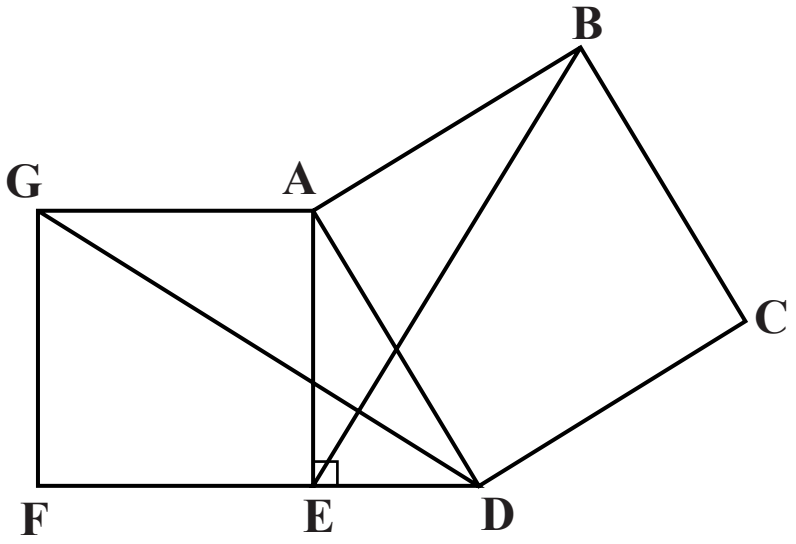
(a) _____ [4]

(b) Solve by factorising.

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

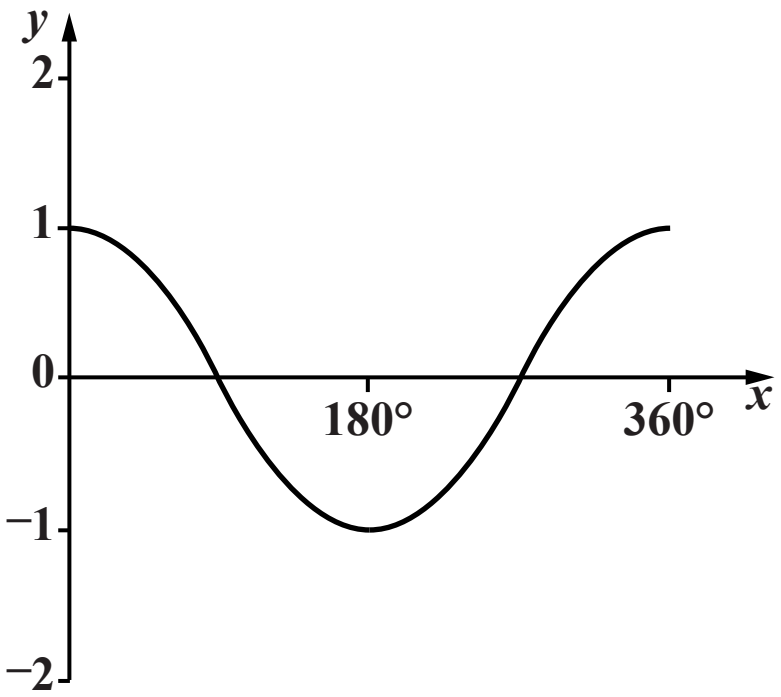
(b) _____ [3]

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]

12 The graph of $y = \cos x$ is sketched below for $0° \leqslant x \leqslant 360°$.



(a) Given that $\cos 70^{o} = 0{\cdot}34$, find $\cos 110^{o}$.

(a) _____ [1]

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