

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS C (GRADUATED ASSESSMENT)**

B282B

Terminal Paper – Section B
(Higher Tier)

**Monday 1 June 2009
Morning**

Duration: 1 hour

Candidates answer on the question paper

OCR Supplied Materials:

None

Other Materials Required:

- Geometrical instruments
- Tracing paper (optional)
- Scientific or graphical calculator



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

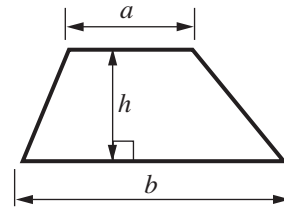
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show all your working. 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

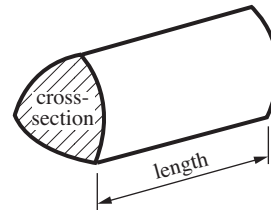
- The number of marks is given in brackets [] at the end of each question or part question.
- Section B starts with question 11.
- You are expected to use a calculator in Section B of this paper.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is **50**.
- This document consists of **12** pages. Any blank pages are indicated.

Formulae Sheet

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



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

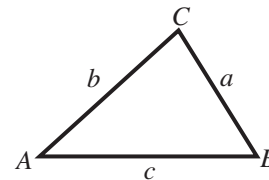


In any triangle ABC

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

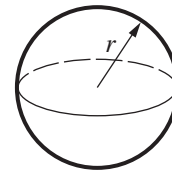
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



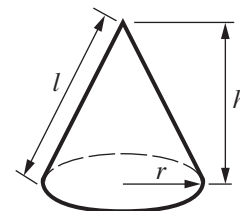
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

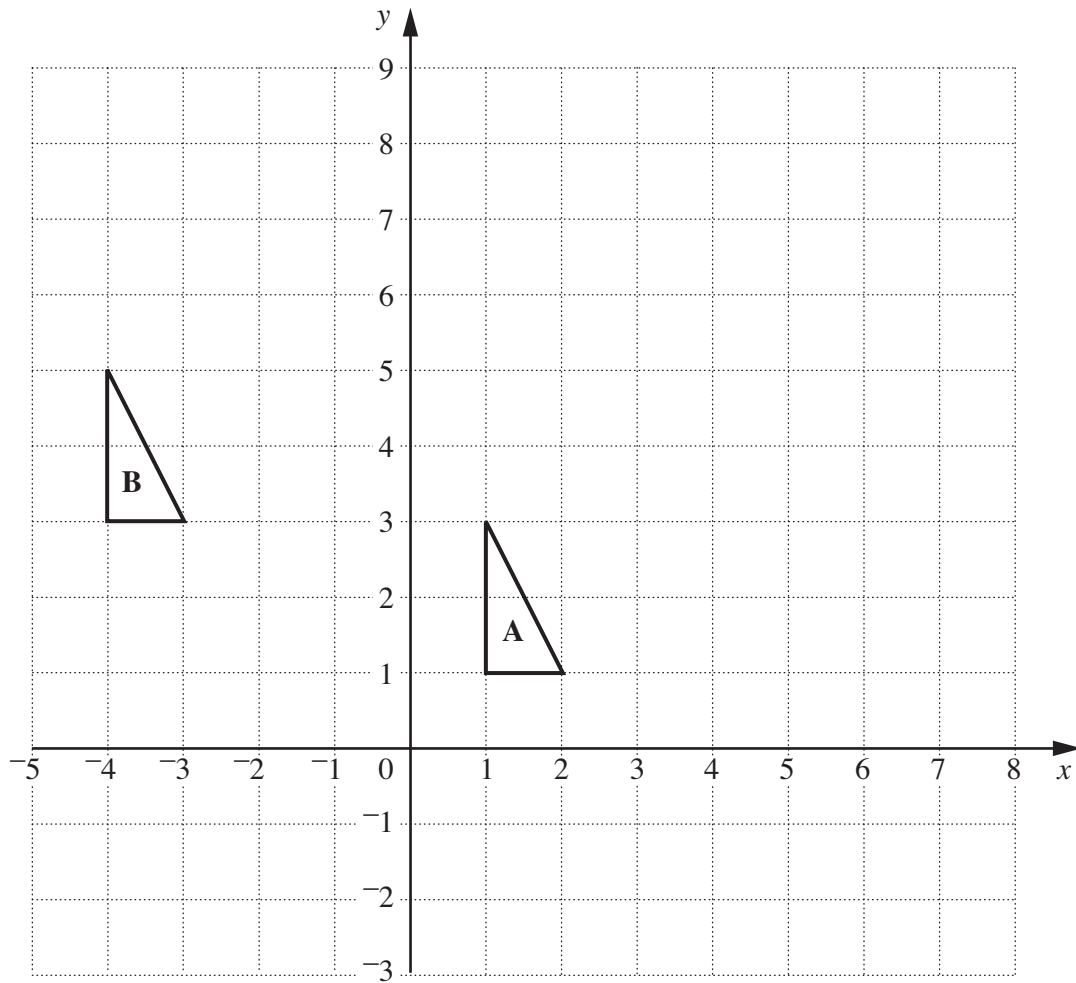


The Quadratic Equation

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

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

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(a) Enlarge triangle **A** with centre $(0, 2)$ and scale factor 3. [3]

(b) Write down the column vector of the translation which maps triangle **A** onto triangle **B**.

(b) $\begin{pmatrix} \dots \\ \dots \end{pmatrix}$ [1]

- 12** Ana did a survey for the local optician.
She asked 100 people whether or not they wore glasses.
This table shows her results.

	Wear glasses	Not wear glasses	Total
Male		32	60
Female	15		40
Total	43		100

- (a) Complete the table. [1]
- (b) One of the 100 people is chosen at random.
What is the probability that this person does not wear glasses?
- (b) [1]
- (c) One of the females is chosen at random.
What is the probability that she wears glasses?
- (c) [1]
- (d) In the survey, Ana wanted to find out how long each day people wore their glasses.
Write a suitable question she could ask, with response boxes for people to tick. [2]

13 Calculate.

$$\frac{17 \times 89}{5.16 \times 0.72}$$

Give your answer correct to 2 decimal places.

..... [2]

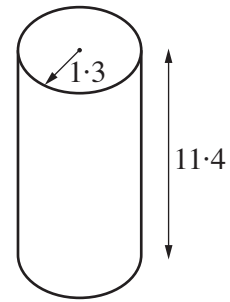
14 The equation $x^3 - 8x + 6 = 0$ has a solution between $x = 2$ and $x = 3$.

Use trial and improvement to find this solution correct to 1 decimal place.
Show all your trials and the values of their outcomes.

..... [3]

6

- 15 A child's wooden building block is a cylinder.
Its radius is 1.3 cm and its height is 11.4 cm.
Its mass is 45 g.



Calculate the density of the wood, in grams per cubic centimetre.
Give your answer to an appropriate degree of accuracy.
Show your method clearly.

.....g/cm³ [6]

- 16 (a)** In a Bank Holiday Sale, a computer shop reduced its price for a printer by 12%.
The normal price was £70.

Calculate the sale price.

(a) £..... [3]

- (b)** In the sale, the price of a computer was reduced by 20%.
Its sale price was £492.

Calculate its normal price.

(b) £ [3]

- 17 (a) Peter investigated how many people were living in each house in his road. This table summarises his results.

Number of people in house	Frequency
1	3
2	7
3	4
4	6
5	6
6	3
7	1

Calculate the mean number of people living in a house in Peter's road.

(a) [3]

- (b) The estimated populations of India and Russia in July 2007 are shown below.

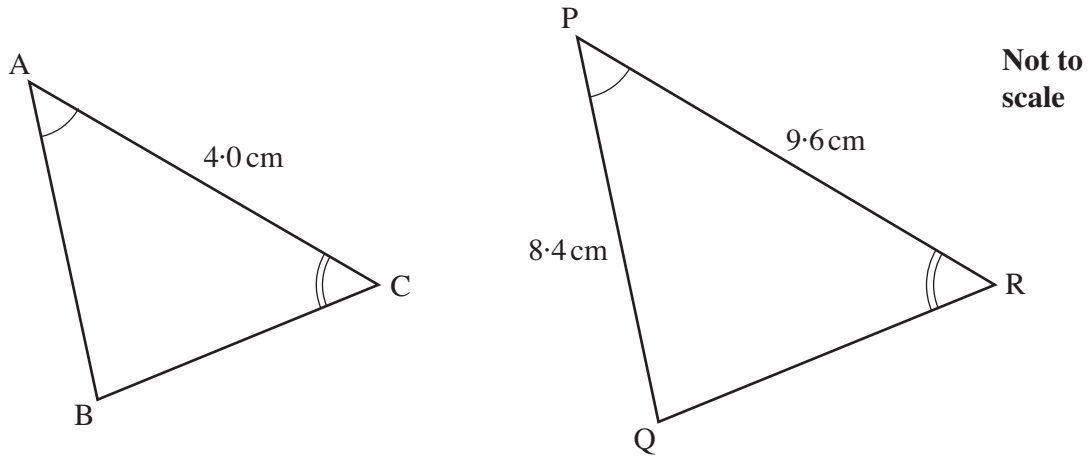
- India 1.13×10^9
- Russia 1.41×10^8

Calculate the difference between these populations.
Give your answer in standard form.

(b) [2]

18 Triangles ABC and PQR are similar, as shown.

Calculate AB.



.....cm [3]

19 Find the value of t for which $5 \times 0.2^t = 6.4 \times 10^{-5}$.

..... [2]

20 (a) Solve.

$$3y + 2 > 5y - 1$$

(a) [2]

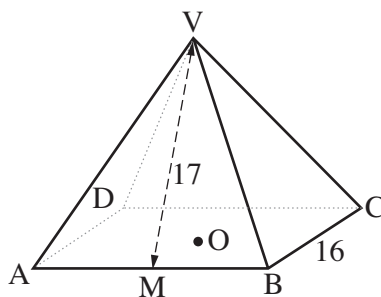
(b) Make p the subject of this formula.

$$C = 2p^2$$

(b) [2]

(c) Express $x^2 - 8x + 5$ in the form $(x - a)^2 + b$.

(c) [3]



VABCD is a pyramid.
 Its base ABCD is a square of side 16 cm.
 O is the centre of the base.
 All the sloping edges are equal.
 M is the midpoint of AB and VM is 17 cm.

(a) Show clearly that the perpendicular height, VO, of the pyramid is 15 cm. [2]

(b) Calculate the volume of the pyramid.

(b)cm³ [2]

(c) Calculate the angle between VM and the base of the pyramid.

(c)° [3]

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