UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
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CAMBRIDGE INTERNATIONAL MATHEMATICS 0607/21

Paper 2 (Extended) **May/June 2011**

45 minutes

Candidates answer on the Question Paper

Additional Materials: Geometrical Instruments

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

Do not use staples, paper clips, highlighters, glue or correction fluid.

You may use a pencil for any diagrams or graphs.

DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.

CALCULATORS MUST NOT BE USED IN THIS PAPER.

All answers should be given in their simplest form.

You must show all the relevant working to gain full marks and you will be given marks for correct methods even if your answer is incorrect.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 40.

For Examiner's Use

This document consists of **8** printed pages.

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International Examinations

[Turn over

Formula List

For the equation $ax^2 + bx + c = 0$ $\qquad$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area, A, of cylinder of radius r, height h. $\qquad$ $A = 2\pi rh$

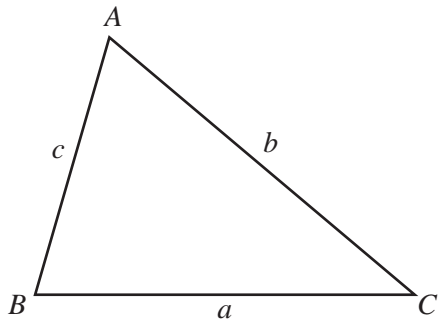Curved surface area, A, of cone of radius r, sloping edge l. $\qquad$ $A = \pi rl$

Curved surface area, A, of sphere of radius r. $\qquad$ $A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $\qquad$ $V = \dfrac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $\qquad$ $V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $\qquad$ $V = \dfrac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\qquad$ $V = \dfrac{4}{3}\pi r^3$

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

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

$$\text{Area} = \dfrac{1}{2}bc \sin A$$

Answer **all** the questions.

1   **(a)** Simplify $\sqrt{75}$.

Answer(a) .... [1]

   (b) Simplify $\dfrac{2}{5-\sqrt{3}}$ by rationalising the denominator.

Answer(b) .... [2]

2   The first four terms of a sequence are 0, 3, 8, 15.

   (a) Write down the next two terms of this sequence.

Answer(a) .... , ... [1]

   (b) Find an expression for the nth term of this sequence.

Answer(b) .... [2]

3   Solve the equation $17 - 2x = 4x - 7$.

Answer x = ... [2]

4 $\mathbf{p} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ $\mathbf{q} = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$

(a) Find $2\mathbf{p} - 3\mathbf{q}$.

Answer(a) $\begin{pmatrix} \\ \end{pmatrix}$ [2]

(b) Calculate $|\mathbf{q}|$.

Answer(b) .... [2]

5 **(a)** Factorise $x^2 - 3x - 4$.

Answer(a) .... [2]

(b) Solve for x.
$$10 < 2(6 - x)$$

Answer(b) .... [2]

6 Using set notation describe the regions shaded on the Venn diagrams.

(a)

U

A   *B*

Answer(a) .... [1]

(b)

U
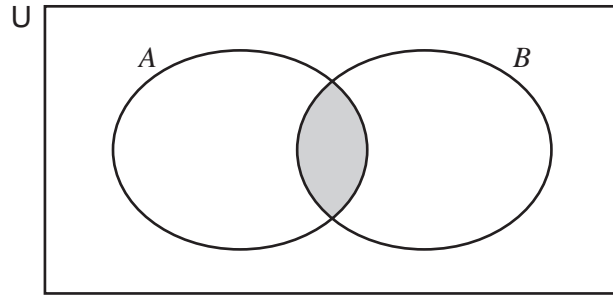
A   *B*
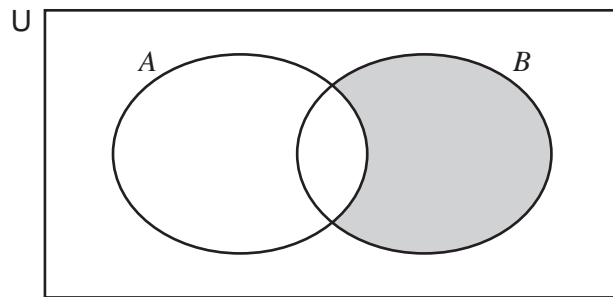
Answer(b) .... [1]

7 *F* varies inversely as the square of *d*.
When $F = 9$, $d = 2$.

(a) Find *F* in terms of *d*.

Answer(a) F = ... [2]

(b) Find the value of *F* when *d* is 3.

Answer(b) F = ... [1]

8   Simplify.

(a) $\log 9 + 3 \log 2 - 2 \log 6$

Answer(a) .... [3]

(b) $\left(\dfrac{81}{16}\right)^{-\frac{3}{4}}$

Answer(b) .... [2]

9 $\dfrac{d}{x-c} = \dfrac{x+c}{d}$

Find x in terms of c and d.

Answer x = ... [3]

10 All the students in a class of 20 took tests in Mathematics and Chemistry.
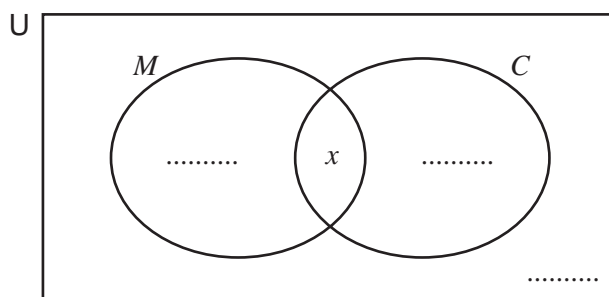The following table shows the results of these two tests.

	Pass	Fail
Mathematics	12	8
Chemistry	11	9

M is the set of students who passed the Mathematics test.
C is the set of students who passed the Chemistry test.
x is the number of students who passed both tests.

(a) Write 3 expressions **in terms of x** to complete the Venn diagram.

U

M .... x C

....

[3]

(b) Two pupils failed both Mathematics and Chemistry.

Find the value of x, the number of students who passed both tests.

Answer(b) x = ... [2]

11 For $0° < x < 360°$ find the values of x that satisfy the equation $\cos x = -\dfrac{1}{2}$.

Answer x = ... and *x =* .... [2]

12
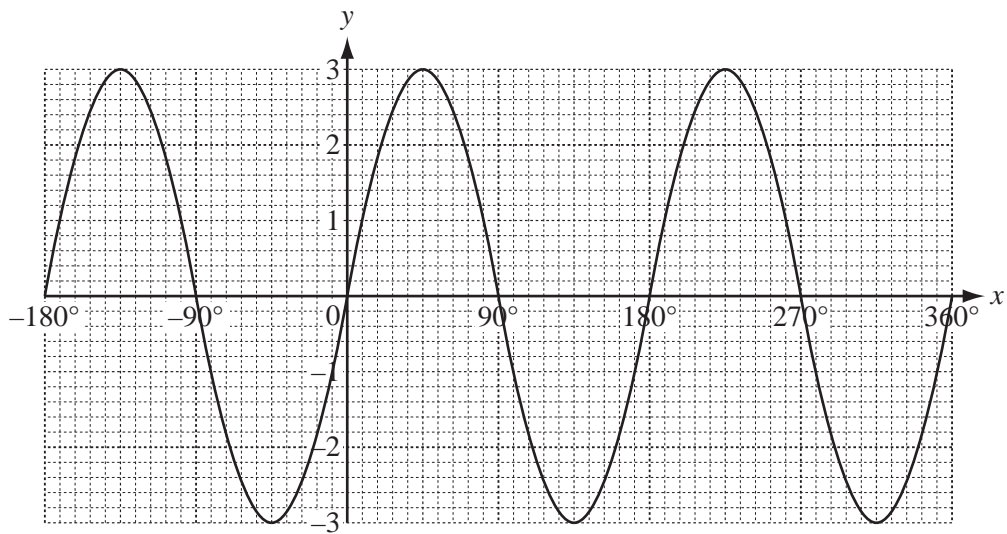
(a) Write down the equation of the graph.

Answer(a) .... [2]

(b) **On the same axes** above sketch the graph of $y = 2 \sin x$ for $-180° \leqslant x \leqslant 360°$. [2]