UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME										
CENTRE NUMBER						CANDIDATE NUMBER				

9433607138

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/22**

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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Formula List

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

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

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

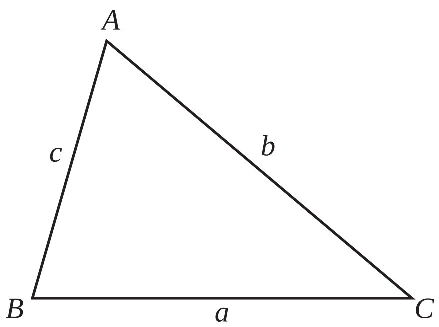
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

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

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

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

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



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

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

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

Answer **all** the questions.

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1 **(a)** Work out $27^{\frac{2}{3}}$.

Answer(a) .... [1]

(b) Simplify $(9c)^{\frac{1}{2}} \times c^{\frac{3}{2}}$.

Answer(b) .... [2]

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2 The first four terms of a sequence are 1, 3, 9, 27.

(a) Write down the next term of this sequence.

Answer(a) .... [1]

(b) Find an expression for the *n*th term of this sequence.

Answer(b) .... [2]

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3 The size of one interior angle of a regular polygon is 156°.

Find the number of sides of the polygon.

Answer .... [2]

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4 $\mathsf{U} = \{ x \mid 1 \leqslant x \leqslant 16, x \in \mathbb{N} \}$

$A = \{$ factors of 12 $\}$

$B = \{$ factors of 16 $\}$

Complete the following.

(a) $A = \{$ .... $\}$ [1]

(b) $n(A \cap B') =$ .... [1]

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5 **(a)** Find the value of $\log_2 8$.

Answer(a) .... [1]

(b) Write the following as a single logarithm.

$$3\log 2 - \log 4 + 2\log 5$$

Answer(b) .... [3]

For Examiner's Use

6 Simplify fully $\dfrac{3a}{a^2-9} \div \dfrac{a}{a-3}$.

Answer .... [3]

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7 $\mathbf{p} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ $\quad \mathbf{q} = \begin{pmatrix} 5 \\ -7 \end{pmatrix}$

(a) Find $\mathbf{p} + \mathbf{q}$.

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

(b) Work out $|\mathbf{p} + \mathbf{q}|$.

Answer(b) .... [2]

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8 **(a)** Simplify $8\sqrt{2} + 2\sqrt{8}$.

Answer(a) .... [2]

(b) Simplify by rationalising the denominator.

$$\frac{3\sqrt{2}}{3-\sqrt{2}}$$

Answer(b) .... [2]

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9 The equation of a line passing through the point (2, 3) is $ax + by = d$, where $a, b, d \in \mathbb{N}$.
This line is perpendicular to the line $y = 2x + 5$.

Find the values of a, b and d.

Answer a = ...

b = ...

d = ... [3]

For Examiner's Use

10 The cost of a mango is $\$m$.
The cost of a pineapple is $\$p$.

(a) Write an expression, in terms of m and p, for the cost of 2 mangoes and 3 pineapples.

Answer(a) \$ .... [1]

(b) The cost of 2 mangoes and 3 pineapples is \$13.
The cost of 6 mangoes and 2 pineapples is \$18.

Write down two equations and solve them to find the cost of one mango and the cost of one pineapple.

Answer(b) mango = \$ ....

pineapple = \$ .... [4]

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11 x is an **obtuse** angle and $\sin x = \frac{1}{2}$.

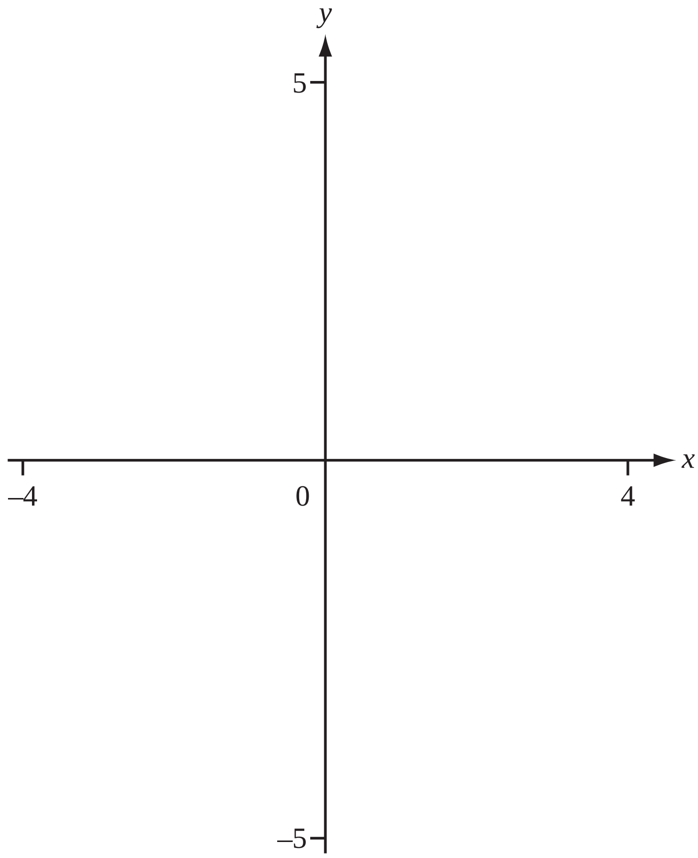
Find the exact value of $\cos x$.

Answer .... [2]

For Examiner's Use

12 The graph of $y = f(x)$ where $f(x) = ax^2 + bx + 3$ crosses the x-axis at $(-3, 0)$ and $(1, 0)$.
The y coordinate of the vertex is 4.

(a) On the axes, sketch the graph of $y = f(x)$, for $-4 \leqslant x \leqslant 4$.



[2]

(b) Find the values of a and b.

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

b = ... [1]

(c) Write down the range of $f(x)$ when the domain is $\mathbb{R}$.

Answer(c) .... [1]