UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/02**

Paper 2 (Extended) **May/June 2009**

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 of the marks for this paper is 40.

For Examiner's Use

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

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. $\quad A = \pi rl$

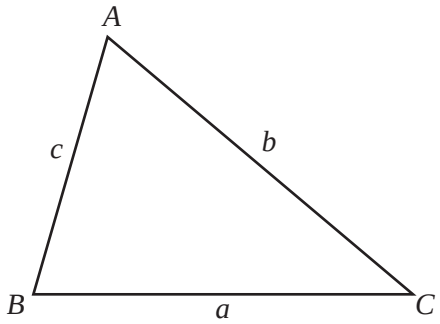
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

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.

1 The distance from the Earth to the Moon is 3.8×10^5 km.
A spacecraft travels this distance four times.
Calculate the total distance travelled.
Give your answer in standard form.

Answer ..... km [2]

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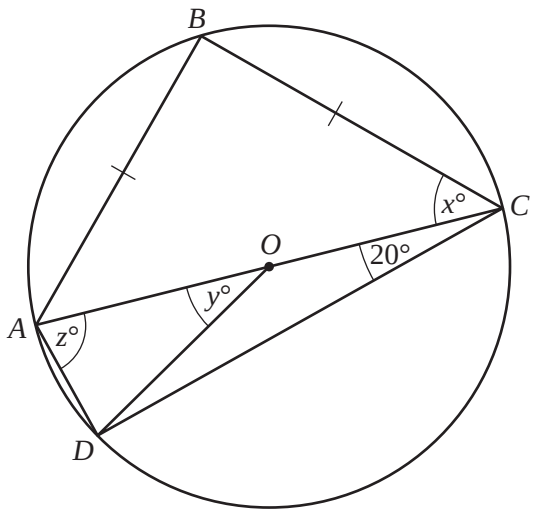
2 For the function $f(x) = 2\sin 3x$ write down

(a) the amplitude, *Answer (a)* ..... [1]

(b) the period. *Answer (b)* ..... [1]

3



NOT TO SCALE

A, *B*, *C* and *D* lie on a circle, centre *O*.
AC is a diameter and angle *ACD* = 20°. *AB* = *BC*.
Find the values of *x*, *y* and *z*.

Answer $x =$ ..... [1]

$y =$ ..... [1]

$z =$ ..... [1]

4 Write the following as algebraic expressions.

(a) One-third of the sum of p and q.

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

(b) The square root of the product of x and y.

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

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5 List the elements of the following sets.

(a) $A = \{x \mid x \in \mathbb{Z}, -4 < x \leqslant 1\}$

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

(b) $B =$ {prime numbers between 25 and 35}

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

(c) $C = \{x \mid x \in \mathbb{R}, |x| = 4\}$

Answer (c) ..... [1]

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6 **(a)** Write as a single logarithm.

$$\log 6 + \log 3 - \log 2$$

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

(b) Simplify.

$$\sqrt{98} - \sqrt{50} + \sqrt{8}$$

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

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7 The first five terms of a sequence are 0, 3, 8, 15, 24.

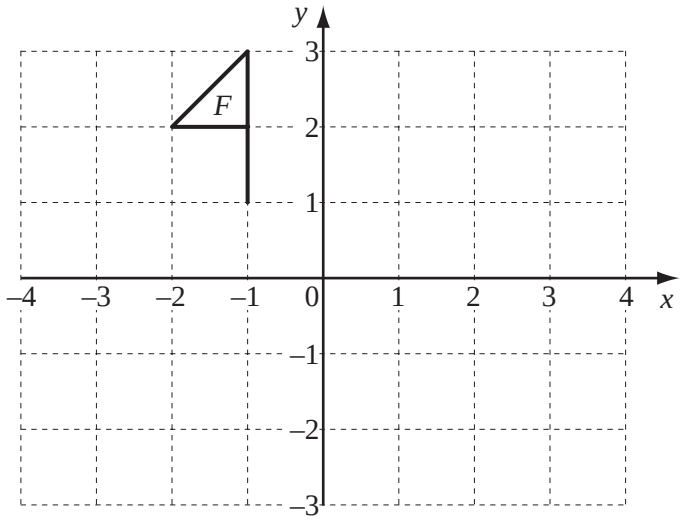
(a) Write down the next two terms of the sequence.

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

(b) Find the *n*th term of the sequence.

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

8



The diagram shows a flag *F*.

(a) Translate flag *F* by $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$. Label the image *P*. [2]

(b) Reflect flag *F* in the line $x = 1$. Label the image *Q*. [2]

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9 Solve the simultaneous equations.

$$2x + 3y = 7$$
$$5x - 4y = -17$$

Answer $x =$ .....

$y =$ ..... [4]

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10 Make t the subject of the formula.

$$y = \frac{a}{t - 2}$$

Answer $t =$ ..... [3]

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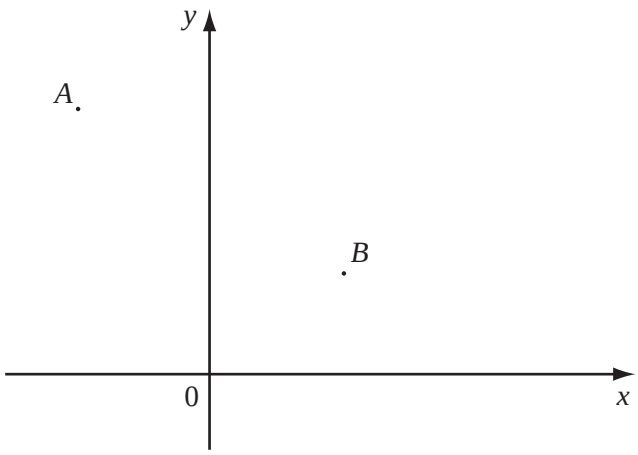
11 The points $A(-3, 5)$ and $B(3, 2)$ are shown on the diagram below.



NOT TO SCALE

(a) (i) Write down the vector $\overrightarrow{AB}$ in component form.

Answer (a)(i) $\begin{pmatrix} \\ \end{pmatrix}$ [1]

(ii) Find $|\overrightarrow{AB}|$ leaving your answer in surd form.

Answer (a)(ii) ..... [2]

(b) Calculate the gradient of the line AB.

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

(c) Calculate the co-ordinates of the midpoint of the line AB.

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

(d) Find the equation of the perpendicular bisector of the line AB.

Answer (d) ..... [2]

Question 12 is on the next page.

12 Find the value of the following.

(a) $16^{\frac{3}{2}}$

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

(b) $(\cos 30°)^2$

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