CANDIDATE
NAME

CENTRE
NUMBER

CANDIDATE
NUMBER

CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/23

Paper 2 (Extended)

May/June 2012

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.

[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. $\qquad V = \dfrac{4}{3}\pi r^3$
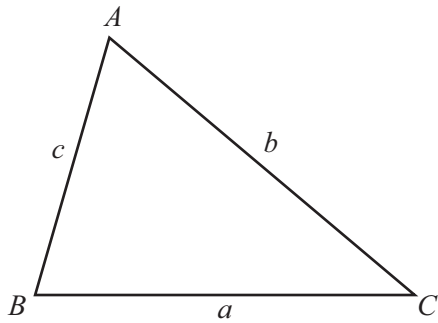
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

Answer **all** the questions.

1 **(a)** Find the value of $49^{-\frac{1}{2}}$.

Answer(a) .... [1]

(b) When $x^{-2} = 4$ write down the values of x.

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

2 **(a)** Factorise

$$6x^2 - x - 2 .$$

Answer(a) .... [2]

(b) Solve the equation

$$6x^2 - x - 2 = 0 .$$

Answer(b) $x =$ .... or $x =$ .... [1]

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

Find

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

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

(b) $|\mathbf{p}|$.

Answer(b) .... [2]

4　Find the next two terms in this sequence.

　　　1,　　2,　　6,　　15,　　31, ...

Answer .... , ... [2]

5 Factorise completely.

(a) $pq - py + xy - qx$

Answer(a) .... [2]

(b) $32c^2 - 50d^2$

Answer(b) .... [2]

6 **(a)** For the function $y = 3\sin 2x$ write down

(i) the amplitude,

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

(ii) the period.

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

(b) Sketch the graph of $y = 3\sin 2x$ on the axes below for $0° \leqslant x \leqslant 360°$.

[2]

 [Turn over
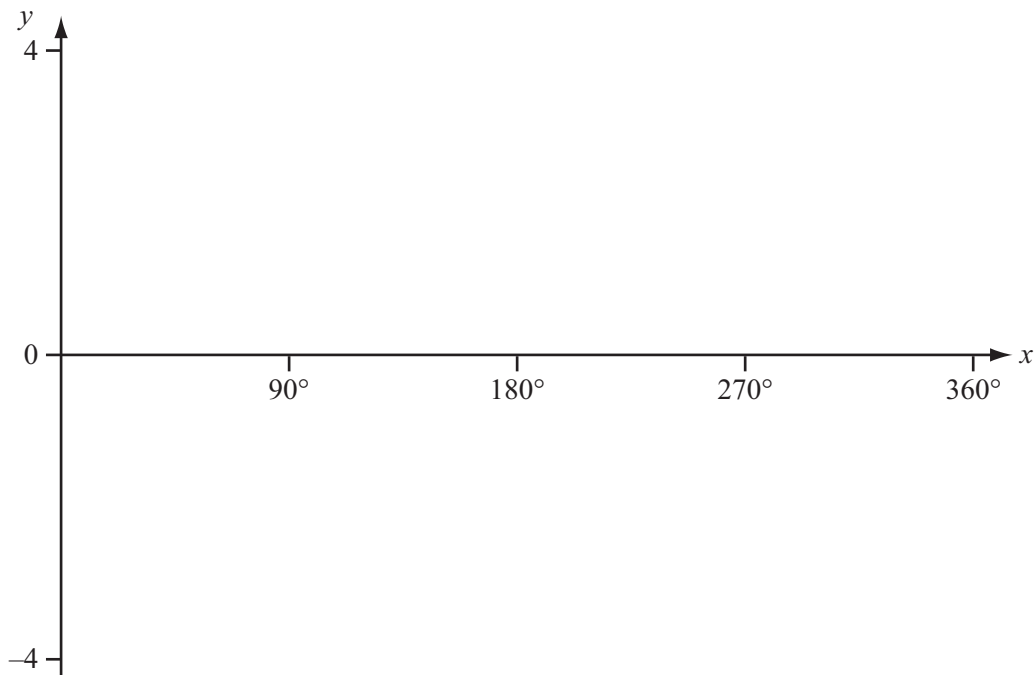
7 Solve the simultaneous equations.

$$3p + 4q = 7$$
$$5p + 6q = 10$$

Answer $p =$ ....

$q =$ .... [4]

8 y varies directly as x^2, where x is a positive integer.
When $x = 3$, $y = 108$.

Calculate the value of x when $y = 300$.

Answer $x =$ .... [3]

9   Joe is training for a triathlon.

     During one training session he
     - swims 1 km in 15 minutes,
     - cycles 20 km at a speed of 20 km/h,
     - runs at a speed of 8 km/h for 45 minutes.

     Calculate Joe's average speed for the training session.
     Give your answer in kilometres per hour.

                                              Answer .... km/h   [3]

10   Solve the equation.
$$\frac{x+3}{7} - \frac{3(x-1)}{14} = 1$$

                                              Answer x = ...   [3]

Questions 11 and 12 are on the next page.

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

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

Answer(a) .... [1]

(b) Make x the subject of $y = \log_3 x$.

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

(c) Simplify completely.

$$\frac{\sqrt{27}}{\sqrt{3}}$$

Answer(c) .... [1]

12 The co-ordinates of three points are $A(-2, 6)$, $B(6, 2)$ and $C(-2, -2)$.

(a) Find the gradient of AB.

Answer(a) .... [1]

(b) D is the midpoint of AB.

By using gradients show that the straight lines AB and CD are not perpendicular.

[3]