



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

CANDIDATE  
NAME

CENTRE  
NUMBER

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**CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/02**

Paper 2 (Extended)

**October/November 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**

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



## Formula List

For the equation

$$ax^2 + bx + c = 0$$

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

Curved surface area,  $A$ , of cylinder of radius  $r$ , height  $h$ .

$$A = 2\pi rh$$

Curved surface area,  $A$ , of cone of radius  $r$ , sloping edge  $l$ .

$$A = \pi rl$$

Curved surface area,  $A$ , of sphere of radius  $r$ .

$$A = 4\pi r^2$$

Volume,  $V$ , of pyramid, base area  $A$ , height  $h$ .

$$V = \frac{1}{3}Ah$$

Volume,  $V$ , of cylinder of radius  $r$ , height  $h$ .

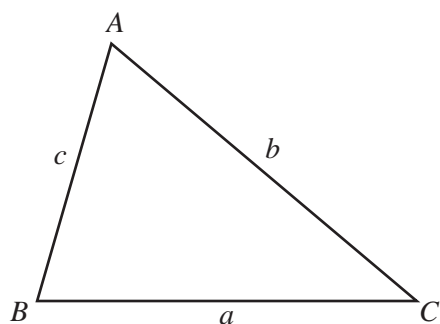
$$V = \pi r^2 h$$

Volume,  $V$ , of cone of radius  $r$ , height  $h$ .

$$V = \frac{1}{3}\pi r^2 h$$

Volume,  $V$ , of sphere of radius  $r$ .

$$V = \frac{4}{3}\pi r^3$$



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

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

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

Answer **all** the questions.

- 1 (a) Write  $375 \times 10^{12}$  in standard form.

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

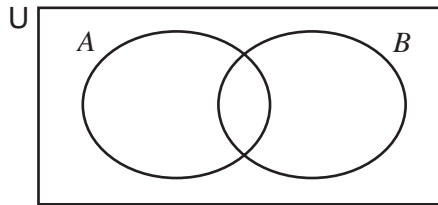
- (b) Calculate 75% of \$2.40.

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

- (c) Solve the equation  $|x + 1| = 2$ .

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

2



- (a)  $n(U) = 20$ ,  $n(A) = 10$ ,  $n(B) = 7$ ,  $n(A \cup B) = 13$ .

Find

- (i)  $n(A \cup B)'$ ,

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

- (ii)  $n(A \cap B)$ .

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

- (b) On the Venn diagram, shade the region  $A \cup B'$ . [1]

3 The equation of a straight line is  $3x + 4y = 12$ .

Write the equation in the form  $y = mx + c$ .

Answer  $y =$  ..... [2]

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4 The volume of a sphere of radius 3 cm is  $k\pi \text{ cm}^3$ .

Find the value of  $k$ .

Answer  $k =$  ..... [2]

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5 (a) Simplify  $\sqrt{125}$ .

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

(b) Simplify  $\frac{1}{\sqrt{6} - \sqrt{3}}$  by rationalising the denominator.

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

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6

6, 12, 24, 48, 96, ...

(a) Write down the next term in the sequence.

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

(b) Find the 8th term in the sequence.

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

(c) Find an expression for the  $n$ th term of the sequence.

Answer(c) ..... [2]

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7 Factorise completely.

(a)  $x^2 - 2x - 24$

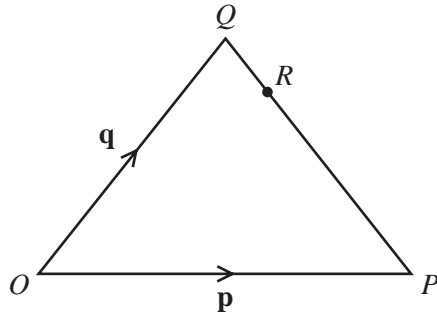
Answer(a) ..... [2]

(b)  $xy^2 - 4xz^2$

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

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8



NOT TO SCALE

The diagram shows the vectors  $\vec{OP} = \mathbf{p}$  and  $\vec{OQ} = \mathbf{q}$ .  
 R is on  $QP$  such that  $QR = \frac{1}{4}QP$ .

Find the following vectors in terms of  $\mathbf{p}$  and  $\mathbf{q}$ .  
 Give each answer in its simplest form.

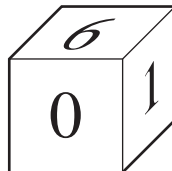
(a)  $\vec{PQ}$

Answer(a)  $\vec{PQ} = \dots\dots\dots$  [1]

(b)  $\vec{OR}$

Answer(b)  $\vec{OR} = \dots\dots\dots$  [2]

9



The die in the diagram has a number on each face.  
 The numbers are 0, 0, 1, 2, 4, 6.  
 The die is rolled until it shows 0 on the top face.

Find the probability that this happens for the first time on the third roll.

Answer  $\dots\dots\dots$  [2]



10 Solve the following equation.

$$\frac{2x+1}{3} + \frac{x+1}{2} = 9$$

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

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11 (a)  $3 = \log_p 8$

Write down the value of  $p$ .

Answer(a)  $p =$  ..... [2]

(b)  $\log 12 + \log 9 = q \log 2 + r \log 3$

Find the values of  $q$  and  $r$ .

Answer(b)  $q =$  .....

$r =$  ..... [3]

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Question 12 is printed on the next page.

- 12** An object moves in a circle with speed  $v$ .  
The force on the object is  $F$ .  
 $F$  varies directly as  $v^2$ .  
When  $v = 5$ ,  $F = 200$ .

**(a)** Find a formula for  $F$  in terms of  $v$ .

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

**(b) (i)** Find  $F$  when  $v = 2$ .

*Answer(b)(i)*  $F =$  ..... [1]

**(ii)** Find  $v$  when  $F = 968$ .

*Answer(b)(ii)*  $v =$  ..... [1]