

Centre No.						Paper Reference					Surname	Initial(s)	
Candidate No.						4	4	0	0	/	3	H	Signature

Paper Reference(s)

**4400/3H**

# London Examinations IGCSE

**Mathematics**

Paper 3H

## Higher Tier

Thursday 6 November 2008 – Morning

Time: 2 hours

Examiner's use only

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Team Leader's use only

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**Materials required for examination**

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

**Items included with question papers**

Nil

**Instructions to Candidates**

In the boxes above, write your centre number, candidate number, your surname, initials and signature. Check that you have the correct question paper.

Answer ALL the questions. Write your answers in the spaces provided in this question paper.

Without sufficient working, correct answers may be awarded no marks.

**You must NOT write on the formulae page. Anything you write on the formulae page will gain NO credit.**

If you need more space to complete your answer to any question, use additional answer sheets.

**Information for Candidates**

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).

There are 20 questions in this question paper. The total mark for this paper is 100.

There are 20 pages in this question paper. Any blank pages are indicated.

You may use a calculator.

**Advice to Candidates**

Write your answers neatly and in good English.

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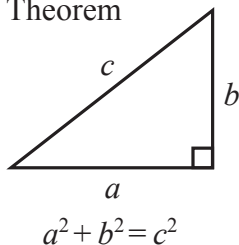


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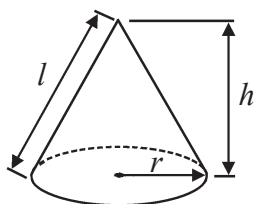
**IGCSE MATHEMATICS 4400  
FORMULA SHEET – HIGHER TIER**

Pythagoras' Theorem



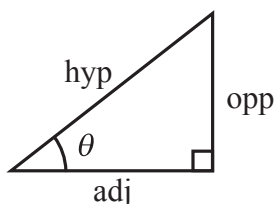
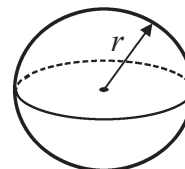
Volume of cone =  $\frac{1}{3} \pi r^2 h$

Curved surface area of cone =  $\pi r l$



Volume of sphere =  $\frac{4}{3} \pi r^3$

Surface area of sphere =  $4 \pi r^2$



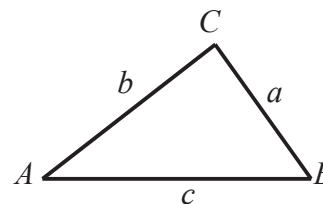
adj = hyp  $\times$  cos  $\theta$   
opp = hyp  $\times$  sin  $\theta$   
opp = adj  $\times$  tan  $\theta$

or  $\sin \theta = \frac{\text{opp}}{\text{hyp}}$

$\cos \theta = \frac{\text{adj}}{\text{hyp}}$

$\tan \theta = \frac{\text{opp}}{\text{adj}}$

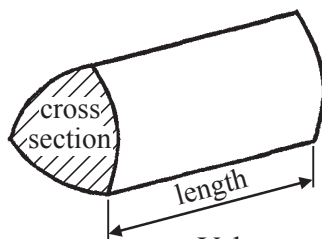
In any triangle ABC



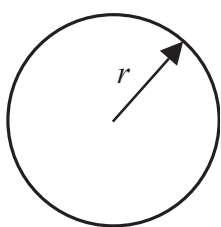
Sine rule:  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

Area of triangle =  $\frac{1}{2} ab \sin C$



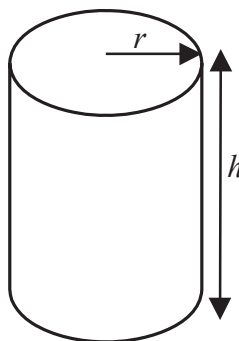
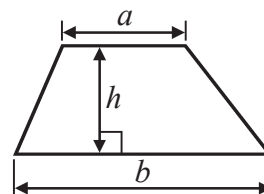
Volume of prism = area of cross section  $\times$  length



Circumference of circle =  $2 \pi r$

Area of circle =  $\pi r^2$

Area of a trapezium =  $\frac{1}{2} (a + b) h$



Volume of cylinder =  $\pi r^2 h$

Curved surface area of cylinder =  $2 \pi r h$

The Quadratic Equation  
The solutions of  $ax^2 + bx + c = 0$ ,  
where  $a \neq 0$ , are given by

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



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Answer ALL TWENTY questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1. Find the value of  $\frac{7.9+3.8}{8.6-2.1}$

.....  
(Total 2 marks)

Q1

2. (a) Factorise  $7p - 21$

.....  
(1)

(b) Solve  $4(x + 5) = 12$   
You must show sufficient working.

$x =$  .....  
(3)

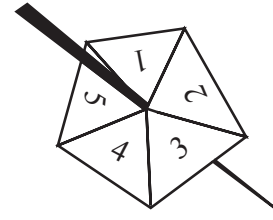
Q2

(Total 4 marks)



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3. Jamila spins this 5-sided spinner 50 times.  
The table shows information about her scores.



Score	Frequency
1	10
2	9
3	3
4	17
5	11

- (a) Work out the mean score.

.....  
(3)

- (b) Jamila is going to spin the spinner once more.  
Find an estimate of the probability that her score will be

(i) 4

.....

(ii) 1 or 3

.....  
(3)

- (c) Is the spinner fair?

Yes

No

Tick (✓) the appropriate box.

Give a reason for your answer.

.....

.....

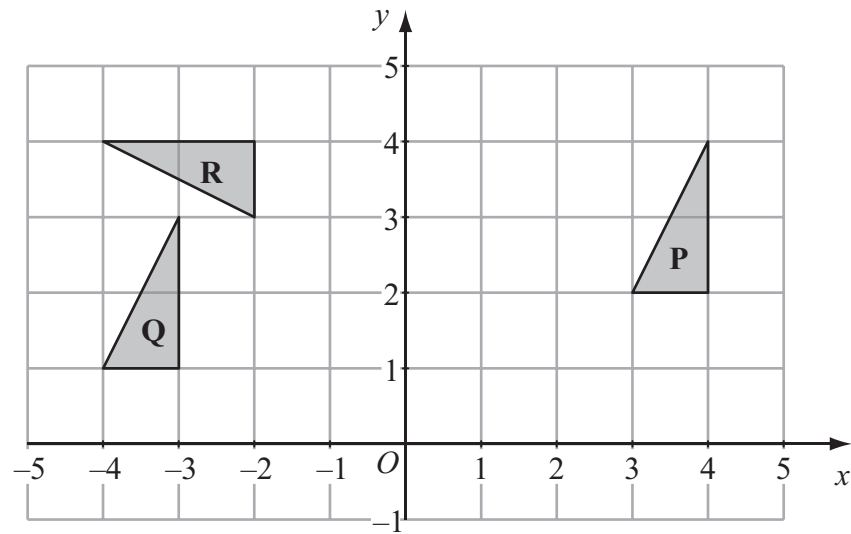
(1)

Q3

(Total 7 marks)



4.



(a) Describe fully the single transformation which maps triangle **P** onto triangle **Q**.

.....  
 .....  
 (2)

(b) Describe fully the single transformation which maps triangle **P** onto triangle **R**.

.....  
 .....  
 (3)

(Total 5 marks)

Q4



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blank

5. In a sale, normal prices were reduced by 35%.

- (a) The normal price of a camera was £180  
Work out the sale price of the camera.

£ .....  
(3)

- (b) The normal price of a clock was reduced by £84  
Work out the normal price of the clock.

£ .....  
(3)

- (c) The sale price of a computer was £442  
Work out the normal price of the computer.

£ .....  
(3)

(Total 9 marks)

Q5



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6.

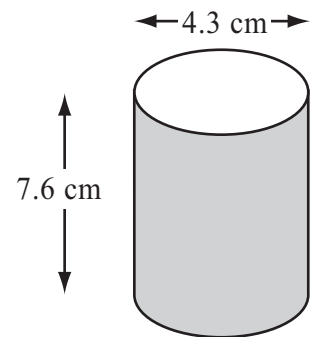


Diagram **NOT**  
accurately drawn

A solid cylinder has a diameter of 4.3 cm and a height of 7.6 cm.

Work out the volume of the cylinder.  
Give your answer correct to 3 significant figures.

..... cm<sup>3</sup>

**(Total 3 marks)**

**Q6**

7. Show that  $\frac{2}{5} \div \frac{4}{7} = \frac{7}{10}$

**(Total 3 marks)**

**Q7**



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8. (a) Simplify

(i)  $p^5 \times p$

.....

(ii)  $\frac{q^8}{q^3}$

.....

(2)

(b) Expand and simplify  $3(4x - 1) - 4(2x - 3)$

.....

(2)

(c) Expand and simplify  $(y + 3)(y + 5)$

.....

(2)

Q8

(Total 6 marks)





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9.

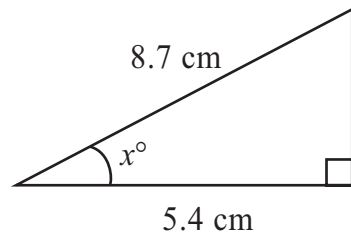


Diagram **NOT** accurately drawn

Work out the value of  $x$ .  
Give your answer correct to 1 decimal place.

$x = \dots\dots\dots$

(Total 3 marks)

Q9

10. The point  $A$  has coordinates  $(5, 13)$  and the point  $B$  has coordinates  $(-1, 1)$ .

(a) Work out the coordinates of the midpoint of  $AB$ .

( $\dots\dots\dots$ ,  $\dots\dots\dots$ )

(2)

The point  $C$  has coordinates  $(0, 7)$ .  
The line  $L$  passes through  $C$  and is parallel to the line  $AB$ .

(b) Find an equation of the line  $L$ .

$\dots\dots\dots$

(4)

(Total 6 marks)

Q10



11. The grouped frequency table gives information about life expectancy in the 54 countries of the Commonwealth.

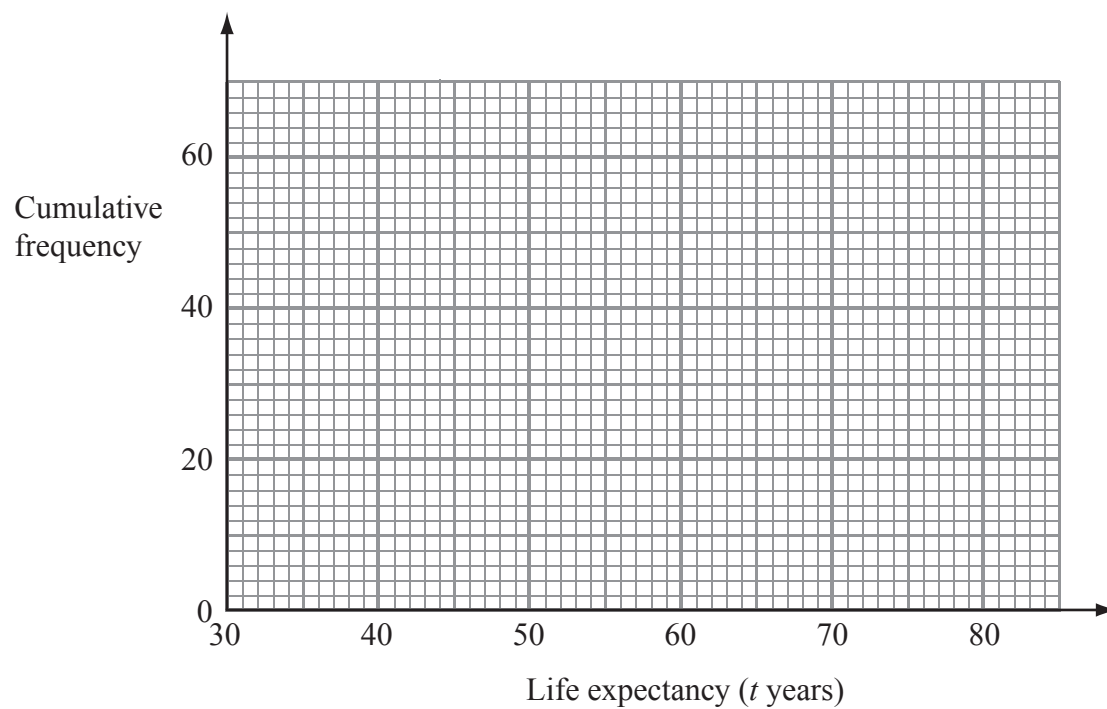
Life expectancy ( $t$ years)	Frequency
$30 < t \leq 40$	4
$40 < t \leq 50$	6
$50 < t \leq 60$	9
$60 < t \leq 70$	14
$70 < t \leq 80$	21

(a) Complete the cumulative frequency table.

Life expectancy ( $t$ years)	Cumulative frequency
$30 < t \leq 40$	
$30 < t \leq 50$	
$30 < t \leq 60$	
$30 < t \leq 70$	
$30 < t \leq 80$	

(1)

(b) On the grid, draw the cumulative frequency graph for your table.



(2)



(c) Use your graph to find an estimate for the median of the life expectancies in Commonwealth countries.

..... years  
(2)

(Total 5 marks)

Leave blank

Q11

12.

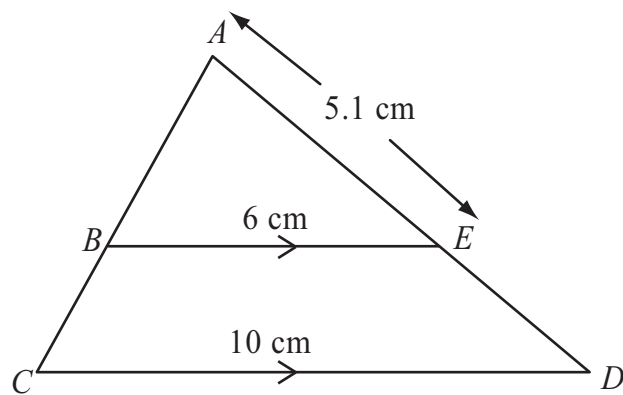


Diagram **NOT** accurately drawn

$ABC$  and  $AED$  are two straight lines.  
 $BE$  is parallel to  $CD$ .  
 $AE = 5.1$  cm,  $BE = 6$  cm,  $CD = 10$  cm.

(a) Calculate the length of  $DE$ .

..... cm  
(3)

(b) Calculate the value of  $\frac{\text{Area of triangle } ABE}{\text{Area of trapezium } BCDE}$

.....  
(3)

(Total 6 marks)

Q12

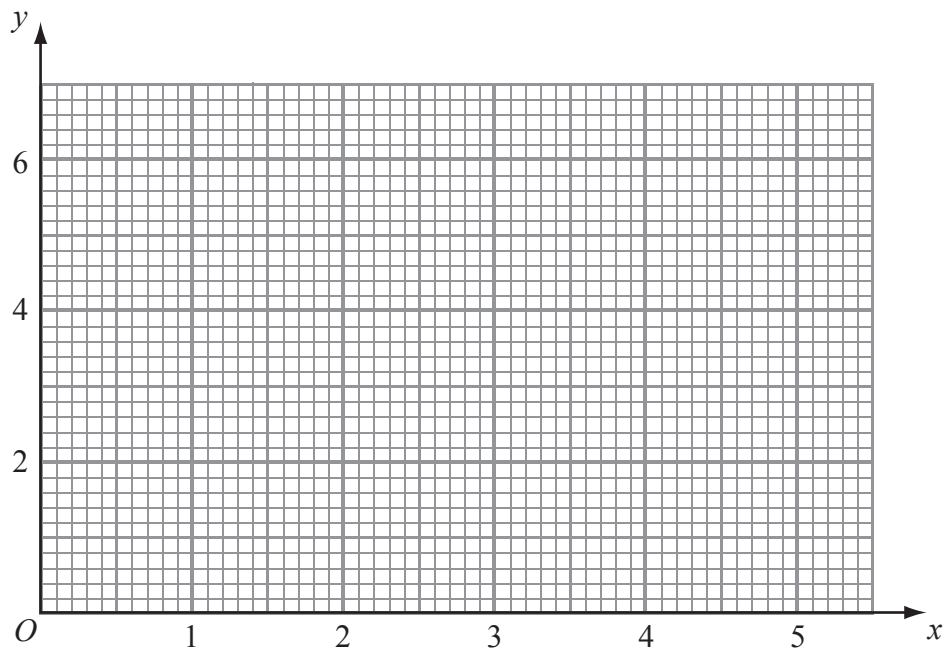


13. (a) Complete the table of values for  $y = x + \frac{1}{x^2}$

$x$	0.5	1	1.5	2	3	4	5
$y$		2		2.3			5.0

(2)

(b) On the grid, draw the graph of  $y = x + \frac{1}{x^2}$  for  $0.5 \leq x \leq 5$



(2)



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(c)  $x = 1$  is a solution of the equation  $x + \frac{1}{x^2} = k$  where  $k$  is a number.

(i) Find the value of  $k$ .

$k = \dots\dots\dots$

(ii) Use your graph to find an estimate for another solution of the equation

$$x + \frac{1}{x^2} = k$$

Give your estimate correct to 1 decimal place.

$x = \dots\dots\dots$

(2)

Q13

(Total 6 marks)

14. (a) Factorise completely  $9ab - 12b^2$

$\dots\dots\dots$

(2)

(b) Simplify  $(2ab^2)^3$

$\dots\dots\dots$

(2)

Q14

(Total 4 marks)



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15. There are 9 counters in a bag.  
7 of the counters are red and 2 of the counters are white.

Ajit takes at random two counters from the bag without replacement.

- (a) Calculate the probability that the two counters are red.

.....  
(2)

- (b) Calculate the probability that the two counters have different colours.

.....  
(3)

(Total 5 marks)

Q15



16.

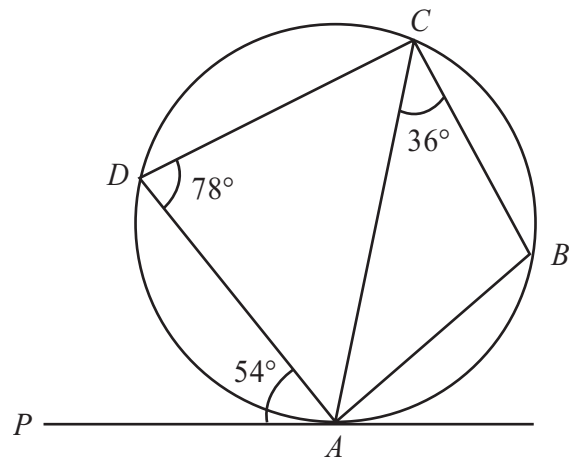


Diagram **NOT** accurately drawn

$A, B, C$  and  $D$  are points on a circle.  
 $PA$  is the tangent to the circle at  $A$ .  
 Angle  $PAD = 54^\circ$ , angle  $ACB = 36^\circ$  and angle  $ADC = 78^\circ$ .

(a) (i) Find the size of angle  $ACD$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

.....  
 .....  
 (2)

(b) Explain why  $BD$  is a diameter of the circle.

.....  
 .....  
 (2)

(c) (i) Work out the size of angle  $ABC$ .

.....<sup>o</sup>

(ii) Give a reason for your answer.

.....  
 .....  
 (2)

(Total 6 marks)

Q16



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17. (a) Convert the recurring decimal  $0.\dot{7}$  to a fraction.

.....  
(2)

$0.0\dot{y}$  is a recurring decimal.  
 $y$  is a whole number such that  $1 \leq y \leq 9$

(b) (i) Write the recurring decimal  $0.0\dot{y}$  as a fraction.

.....  
  
(ii)  $0.1\dot{y}$  is also a recurring decimal.  
Using your answer to part (i), or otherwise, convert the recurring decimal  $0.1\dot{y}$  to a fraction.  
Give your answer as simply as possible.

.....  
(3)

(Total 5 marks)

Q17





18. Simplify fully  $\frac{2}{x+2} + \frac{x}{x^2+5x+6}$

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blank

.....  
Q18

(Total 5 marks)

17

Turn over



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19.

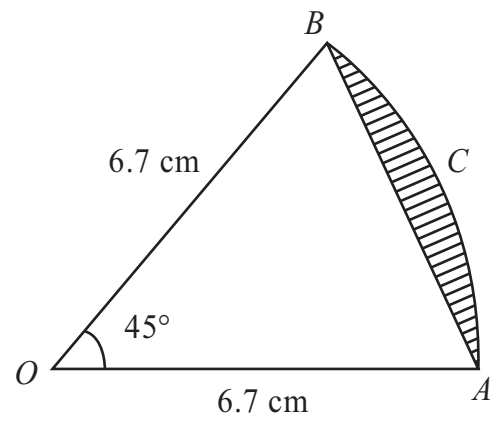


Diagram **NOT** accurately drawn

$AB$  is a chord of a circle, centre  $O$ .  
 $ACB$  is an arc of the circle.  
 $OA = OB = 6.7 \text{ cm}$ .  
Angle  $AOB = 45^\circ$ .

Calculate the area of the shaded segment.  
Give your answer correct to 3 significant figures.

.....  $\text{cm}^2$   
(Total 5 marks)

Q19



20.

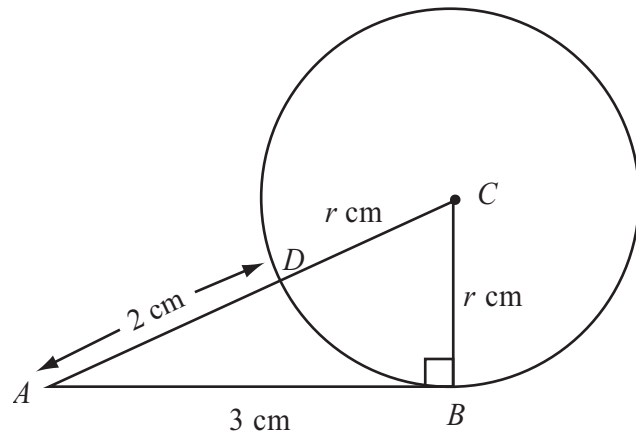


Diagram **NOT** accurately drawn

$B$  and  $D$  are points on a circle, centre  $C$ .  
 $AB$  is the tangent to the circle at  $B$ .  
 $ADC$  is a straight line.  
 $AB = 3$  cm.  
 $AD = 2$  cm.

The radius of the circle is  $r$  cm.  
 Find the value of  $r$ .

$r = \dots\dots\dots$

(Total 5 marks)

Q20

**TOTAL FOR PAPER: 100 MARKS**

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