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

Paper Reference(s)

4400/3H

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Mathematics

Paper 3H

Higher Tier

Thursday 6 November 2008 – Morning

Time: 2 hours

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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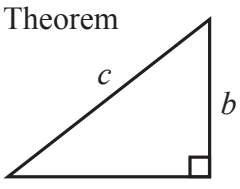
IGCSE MATHEMATICS 4400
FORMULA SHEET – HIGHER TIER

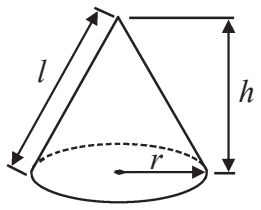
Pythagoras' Theorem



$a^2 + b^2 = c^2$

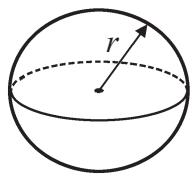
Volume of cone = $\frac{1}{3}\pi r^2 h$

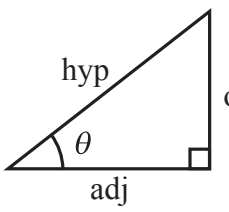
Curved surface area of cone = $\pi r l$



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

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





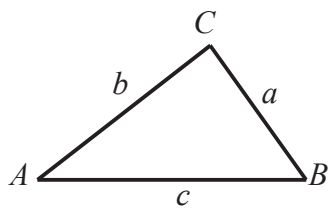
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

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

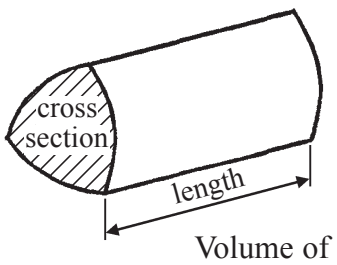
In any triangle ABC



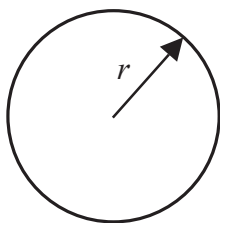
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



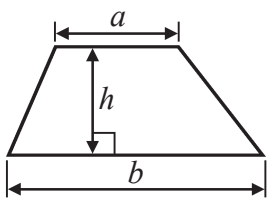
Volume of prism = area of cross section × length

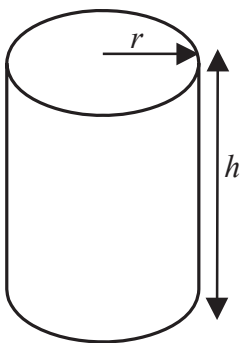


Circumference of circle = $2\pi r$

Area of circle = πr^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

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

Leave blank

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 $\dfrac{7.9+3.8}{8.6-2.1}$

.....

(Total 2 marks)

Q1

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

.....

(1)

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

$x =$ .....

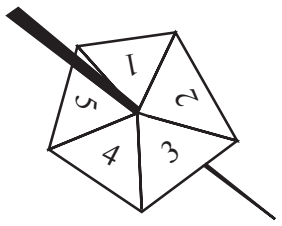
(3)

(Total 4 marks)

Q2

Leave blank

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?

Tick (✓) the appropriate box.

Yes	No
☐	☐

Give a reason for your answer.

.....

.....

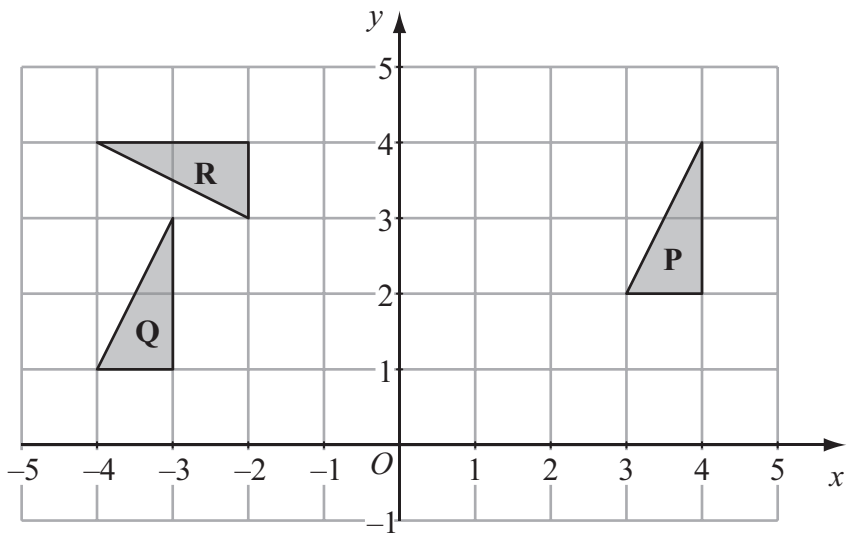
(1)

Q3

(Total 7 marks)

Leave blank

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

Turn over

Leave 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)

Q5

(Total 9 marks)

Leave blank

6.

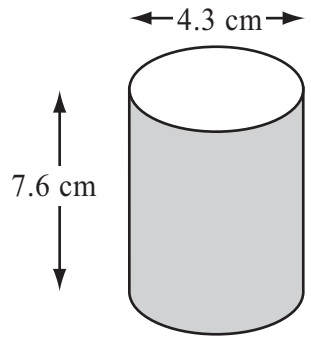


Diagram **NOT** accurately drawn

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^3

Q6

(Total 3 marks)

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

Q7

(Total 3 marks)

Leave blank

8. (a) Simplify

(i) $p^5 \times p$

.....

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

.....

(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)

Leave blank

9.

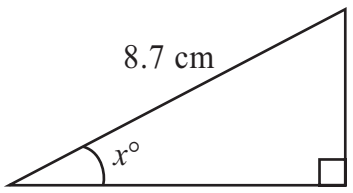


Diagram **NOT** accurately drawn

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

x = ...

(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.

(..... , ...)

(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**.

.....

(4)

(Total 6 marks)

Q10

Leave blank

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

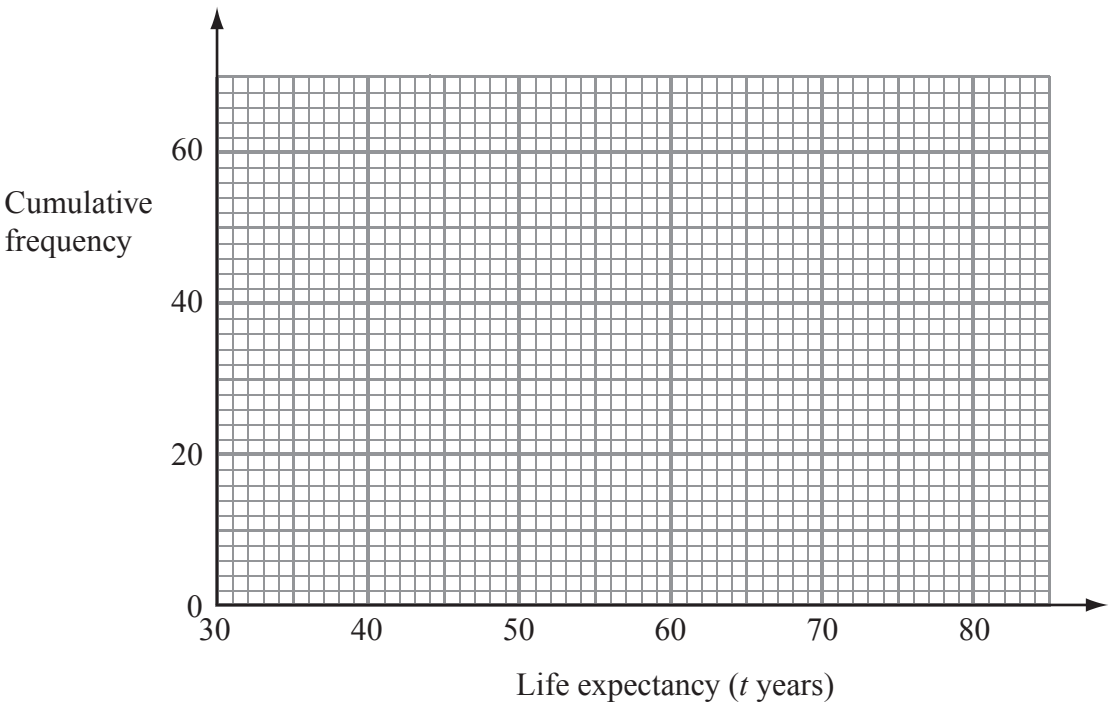
Life expectancy (t years)	**Frequency**
$30 < t \leqslant 40$	4
$40 < t \leqslant 50$	6
$50 < t \leqslant 60$	9
$60 < t \leqslant 70$	14
$70 < t \leqslant 80$	21

(a) Complete the cumulative frequency table.

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

(1)

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



(2)

Leave blank

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

..... years
(2)

(Total 5 marks)

Q11

12.

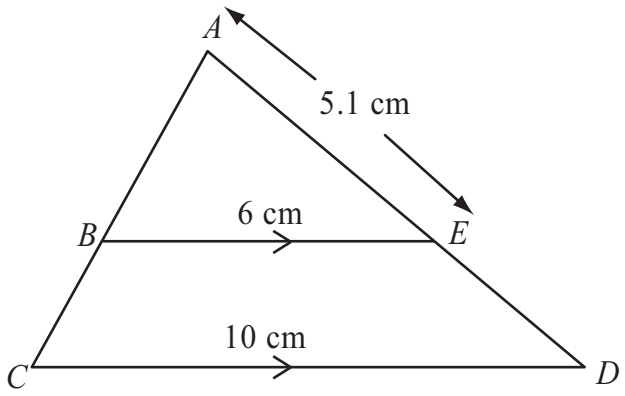


Diagram **NOT** accurately drawn

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 $\dfrac{\text{Area of triangle } ABE}{\text{Area of trapezium } BCDE}$

.....
(3)

(Total 6 marks)

Q12

Turn over

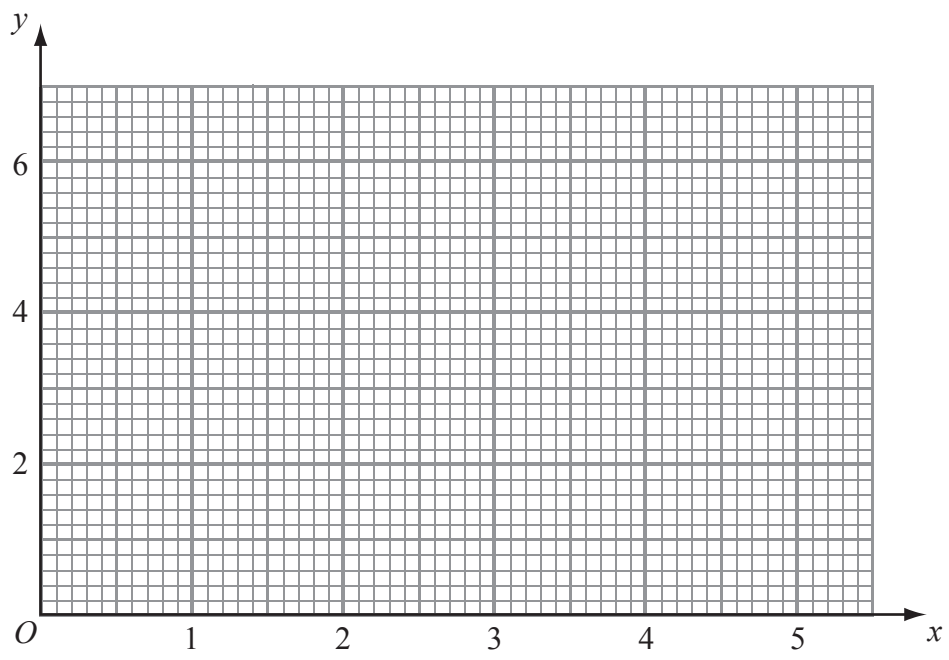
Leave blank

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 $0.5 \leqslant x \leqslant 5$



(2)

Leave blank

(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.

$k =$ .....

(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.

$x =$ .....

(2) **Q13**

(Total 6 marks)

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

.....

(2)

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

.....

(2) **Q14**

(Total 4 marks)

Leave blank

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

Leave blank

16.

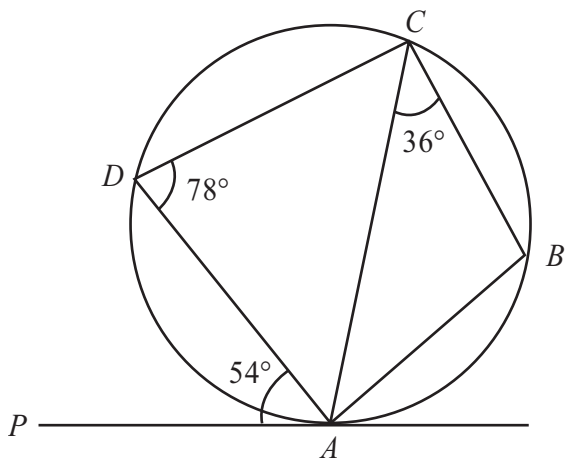


Diagram **NOT** accurately drawn

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

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

..... °

(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*.

..... °

(ii) Give a reason for your answer.

.....

.....

(2)

Q16

(Total 6 marks)

Leave blank

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 $1 \leqslant y \leqslant 9$

(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)

Q17

(Total 5 marks)

Leave blank

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

.....

(Total 5 marks)

Q18

Leave blank

19.

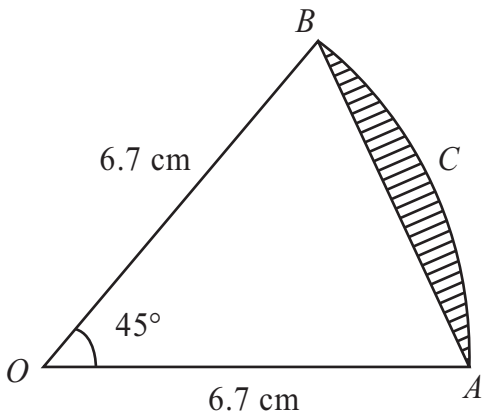


Diagram **NOT** accurately drawn

AB is a chord of a circle, centre *O*.
ACB is an arc of the circle.
OA = *OB* = 6.7 cm.
Angle *AOB* = 45°.

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

..... cm^2

(Total 5 marks)

Q19

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20.

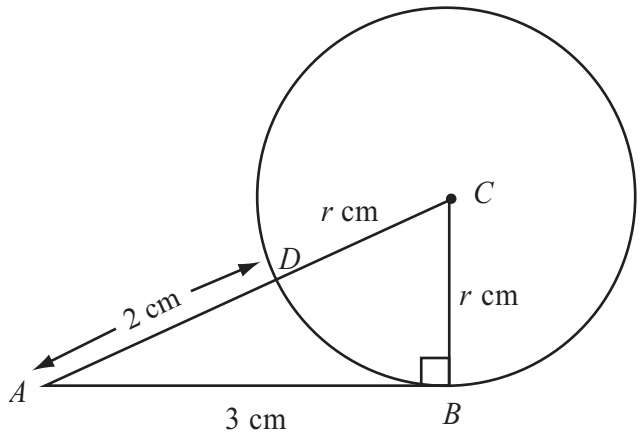

Diagram **NOT** accurately drawn

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 = ...

Q20

(Total 5 marks)

TOTAL FOR PAPER: 100 MARKS

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