Centre No.						Surname	Initial(s)
Candidate No.						Signature	

Paper Reference(s)

4400/3H

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Mathematics

Paper 3H

Higher Tier

Thursday 12 May 2005 – 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

Page Numbers	Leave Blank
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19	
Total	

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
The paper reference is shown at the top of this page. Check that you have the correct question paper.
Answer **ALL** the questions in the spaces provided in this question paper.
Show all the steps in any calculations.

Information for Candidates

There are 20 pages in this question paper. All blank pages are indicated.
The total mark for this paper is 100. The marks for parts of questions are shown in round brackets: e.g. **(2)**.
You may use a calculator.

Advice to Candidates

Write your answers neatly and in good English.

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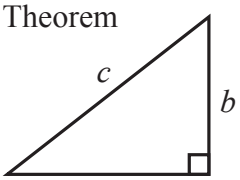
edexcel INTERNATIONAL

IGCSE MATHEMATICS 4400
FORMULA SHEET – HIGHER TIER

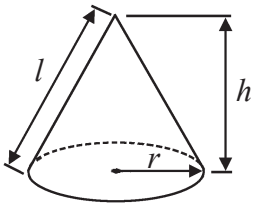
Pythagoras' Theorem



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

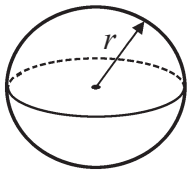
Volume of cone = $\frac{1}{3}\pi r^2 h$

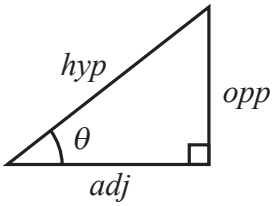
Curved surface area of cone = $\pi r l$



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

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





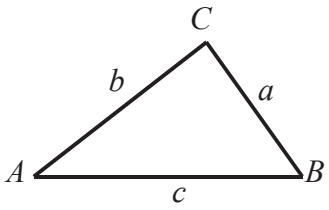
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

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

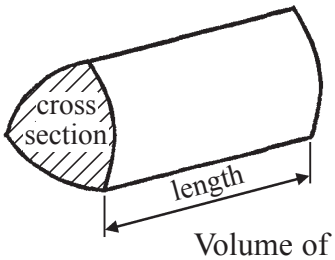
In any triangle ABC



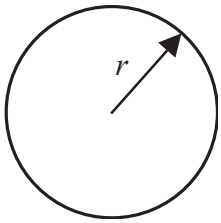
Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



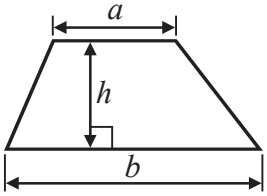
Volume of prism = area of cross section × length

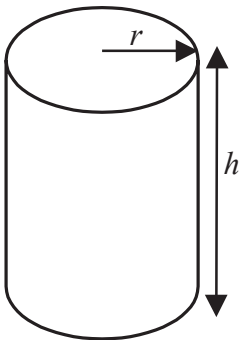


Circumference of circle = $2\pi r$

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 = $2\pi rh$

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 TWO questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1. Use your calculator to work out the value of $\dfrac{9.5-3.7}{1.3\times 2.4}$

Write down all the figures on your calculator display.

.....

(Total 2 marks)

Q1

2. Solve $5(2x+3)=30$

$x =$ .....

(Total 3 marks)

Q2

Leave blank

3. Work out $\frac{5}{6} - \frac{4}{9}$

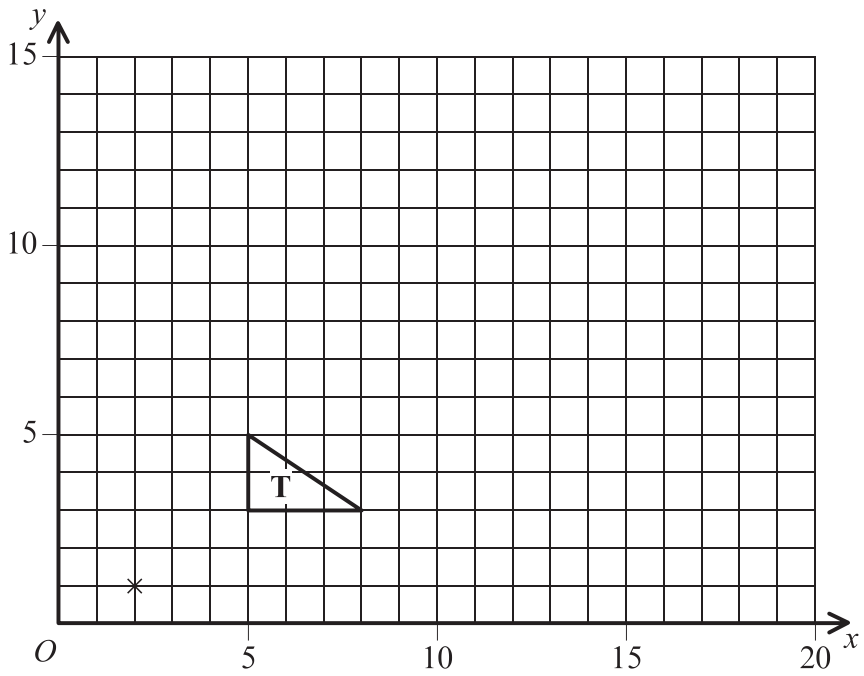
Give your answer as a fraction in its simplest form.

.....

Q3

(Total 2 marks)

4.



On the grid, enlarge triangle **T** with a scale factor of 3 and centre (2, 1).

Q4

(Total 3 marks)

Leave blank

5. The probability that a person chosen at random has brown eyes is 0.45
The probability that a person chosen at random has green eyes is 0.12

(a) Work out the probability that a person chosen at random has either brown eyes **or** green eyes.

.....
(2)

250 people are to be chosen at random.

(b) Work out an estimate for the number of people who will have green eyes.

.....
(2) **Q5**

(Total 4 marks)

6. (a) Factorise $9p + 15$

.....
(1)

(b) Factorise $q^2 - 4q$

.....
(1)

(c) Factorise $x^2 - 3x - 10$

.....
(2) **Q6**

(Total 4 marks)

Leave blank

7.

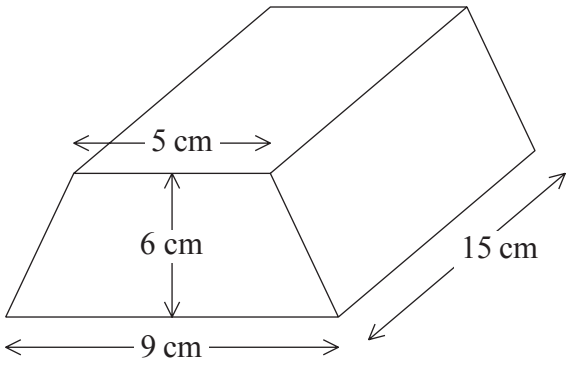


Diagram **NOT** accurately drawn

The diagram shows a prism.
The cross section of the prism is a trapezium.
The lengths of the parallel sides of the trapezium are 9 cm and 5 cm.
The distance between the parallel sides of the trapezium is 6 cm.
The length of the prism is 15 cm.

(a) Work out the area of the trapezium.

..... cm^2
(2)

(b) Work out the volume of the prism.

..... cm^3
(2)

Q7

(Total 4 marks)

Leave blank

8. In a sale at *Bargain Buys*, all the normal prices are reduced by 15%.
The normal price of a printer is £240

(a) Work out the sale price of the printer.

£.....
(3)

In the same sale, the sale price of a laptop computer is £663

(b) Work out the normal price of the laptop computer.

£.....
(3) **Q8**

(Total 6 marks)

9. (a) Solve the inequality $2x - 3 < 5$

.....
(2)

(b) n is a positive integer.

Write down all the values of n which satisfy the inequality $2n - 3 < 5$

.....
(2) **Q9**

(Total 4 marks)

Leave blank

10. The table gives information about the ages, in years, of the 80 members of a sports club.

Age (t years)	**Frequency**
$10 < t \leqslant 20$	8
$20 < t \leqslant 30$	38
$30 < t \leqslant 40$	28
$40 < t \leqslant 50$	4
$50 < t \leqslant 60$	2

(a) Work out an estimate for the mean age of the 80 members.

..... years
(4)

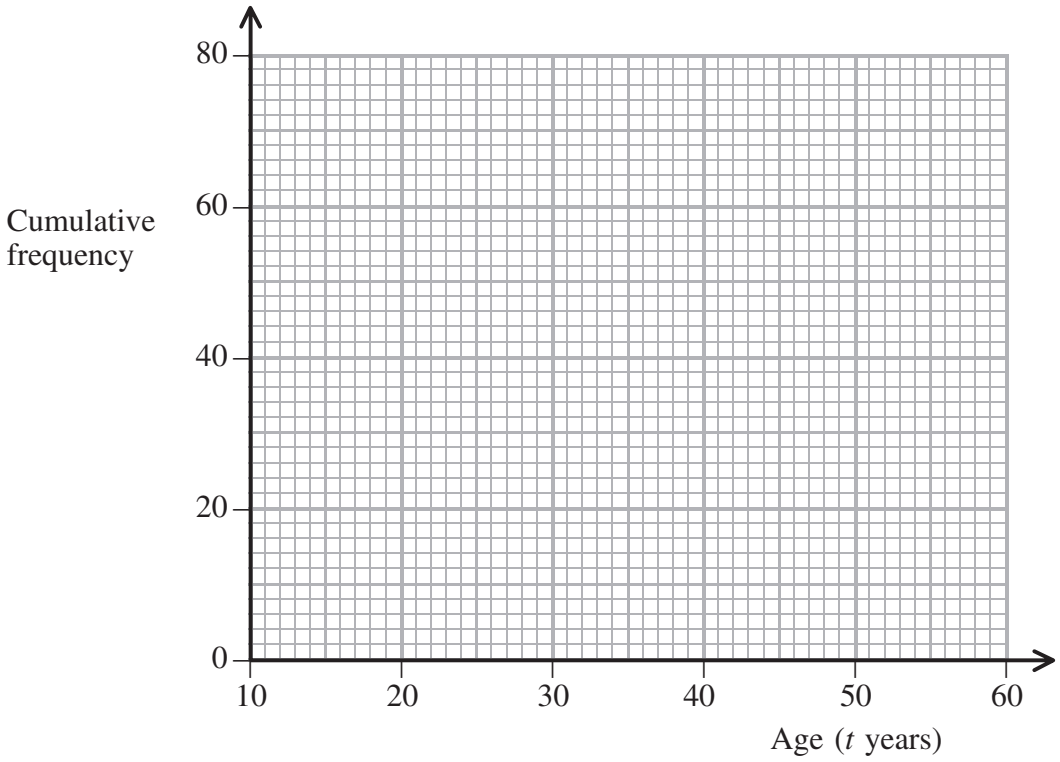
(b) Complete the cumulative frequency table.

Age (t years)	**Cumulative frequency**
$10 < t \leqslant 20$	
$10 < t \leqslant 30$	
$10 < t \leqslant 40$	
$10 < t \leqslant 50$	
$10 < t \leqslant 60$	

(1)

Leave blank

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



(2)

(d) Use your graph to find an estimate for the median age of the members of the club. Show your method clearly.

..... years

(2) **Q10**

(Total 9 marks)

11. Make W the subject of the formula $h = \sqrt{\frac{W}{I}}$

$W =$ **Q11**

(Total 2 marks)

Leave blank

12. The height of a hall is 12 m.
A scale model is made of the hall.
The height of the scale model of the hall is 30 cm.

(a) Express the scale of the model in the form $1 : n$

.....
(3)

The length of the scale model of the hall is 95 cm.

(b) Work out the real length of the hall.
Give your answer in metres.

..... m
(3) **Q12**

(Total 6 marks)

13. The size of each exterior angle of a regular polygon is 18°.

(a) Work out how many sides the polygon has.

.....
(2)

(b) Work out the **sum** of the interior angles of the polygon.

°
.....
(2) **Q13**

(Total 4 marks)

Leave blank

14. Solve $\frac{x-1}{2}+\frac{2x+3}{4}=1$

$x =$ .....

(Total 4 marks)

Q14

15. (a) Express $\frac{10}{\sqrt{5}}$ in the form $k\sqrt{5}$ where k is an integer.

.....

(2)

(b) Express $(5+\sqrt{3})^2$ in the form $a+b\sqrt{3}$ where a and b are integers.

.....

(2)

Q15

(Total 4 marks)

Leave blank

16.

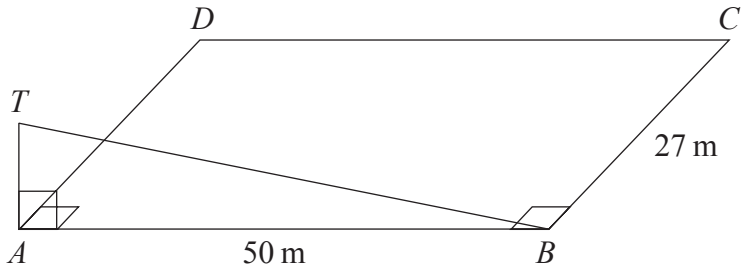


Diagram **NOT** accurately drawn

ABCD is a horizontal rectangular field.
AB = 50 m.
BC = 27 m.
AT is a vertical mast.

(a) The angle of elevation of *T* from *B* is 19°.
Calculate the length of *AT*.
Give your answer correct to 3 significant figures.

..... m
(3)

(b) Calculate the distance from *C* to *T*.
Give your answer correct to 3 significant figures.

..... m
(3)

Q16

(Total 6 marks)

Leave blank

17.

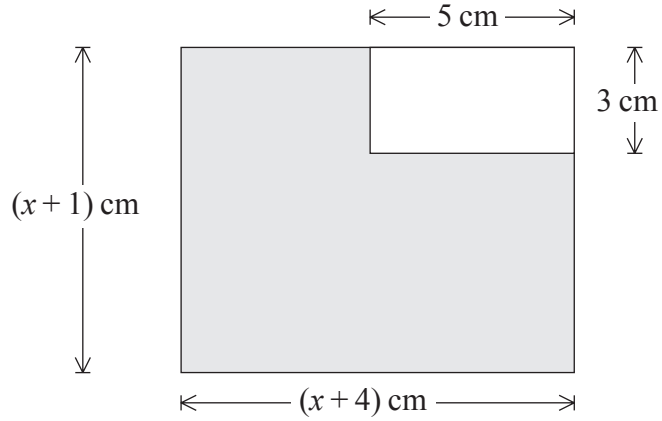


Diagram **NOT** accurately drawn

A rectangular piece of card has length $(x + 4)$ cm and width $(x + 1)$ cm.
A rectangle 5 cm by 3 cm is cut from the corner of the piece of card.
The remaining piece of card, shown shaded in the diagram, has an area of 35 cm^2.

(a) Show that $x^2 + 5x - 46 = 0$

(3)

(b) Solve $x^2 + 5x - 46 = 0$ to find the value of x.
Give your answer correct to 3 significant figures.

$x =$ .....

(3)

Q17

(Total 6 marks)

Leave blank

18.

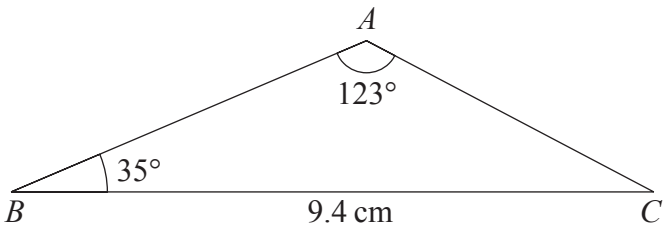


Diagram **NOT** accurately drawn

$BC = 9.4$ cm.
Angle $BAC = 123°$.
Angle $ABC = 35°$.

(a) Calculate the length of AC.
Give your answer correct to 3 significant figures.

..... cm
(3)

(b) Calculate the area of triangle ABC.
Give your answer correct to 3 significant figures.

..... cm^2
(3)

Q18

(Total 6 marks)

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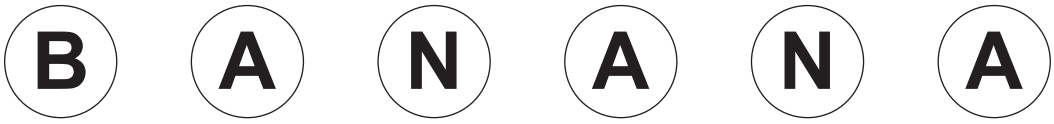
19. The diagram shows six counters.



Each counter has a letter on it.

Bishen puts the six counters into a bag.
He takes a counter at random from the bag.
He records the letter which is on the counter and replaces the counter in the bag.
He then takes a second counter at random and records the letter which is on the counter.

(a) Calculate the probability that the first letter will be A and the second letter will be N.

.....

(2)

(b) Calculate the probability that both letters will be the same.

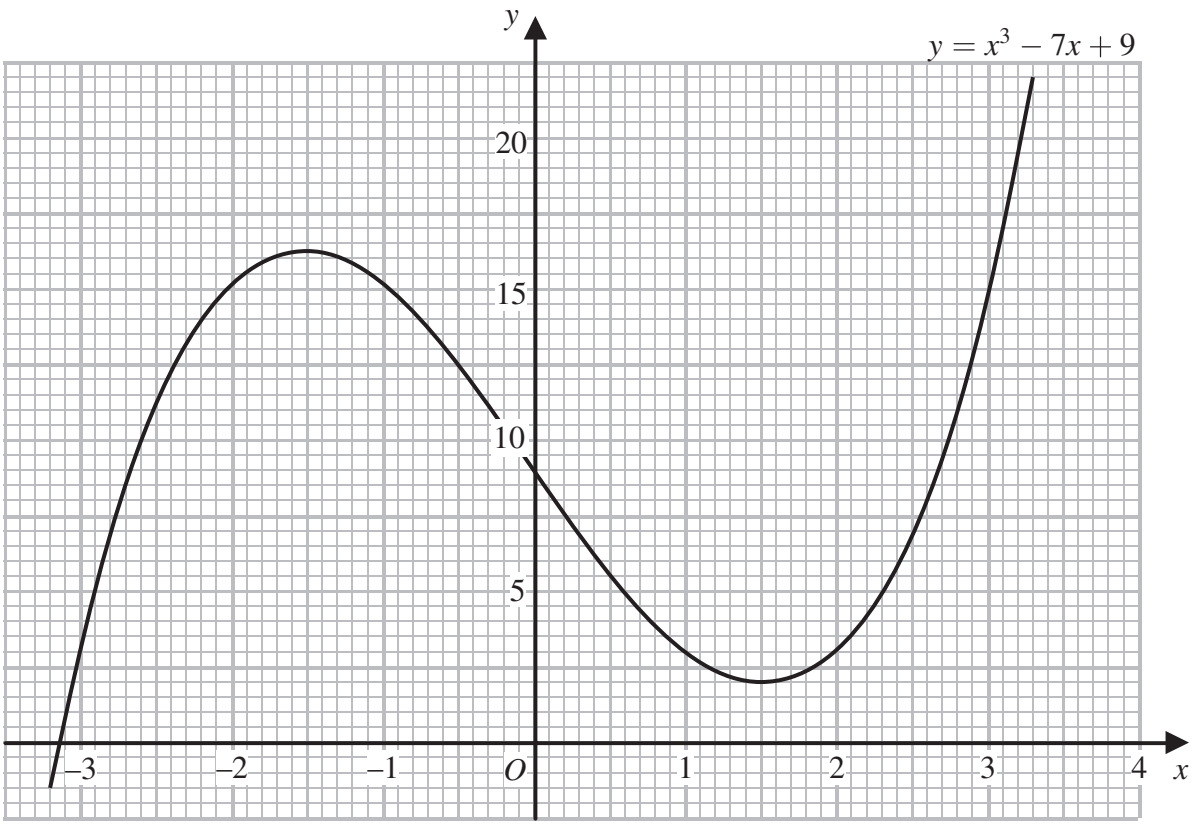
.....

(4) **Q19**

(Total 6 marks)

Leave blank

20. Part of the graph of $y = x^3 - 7x + 9$ is shown on the grid.



The graph of $y = x^3 - 7x + 9$ and the line with equation $y = k$, where k is an integer, have 3 points of intersection.

(a) Find the greatest possible value of the integer k.

$k =$ .....

(1)

Leave blank

(b) By drawing a suitable straight line on the grid, find estimates of the solutions of the equation $x^3 - 6x - 2 = 0$.
Give your answers correct to 1 decimal place.

.....

(3)

(Total 4 marks)

Q20

Leave blank

21.

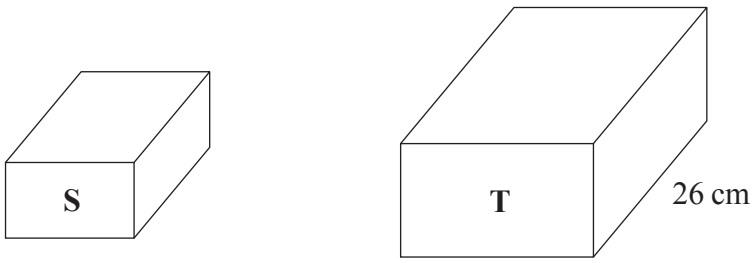


Diagram **NOT** accurately drawn

Two cuboids, **S** and **T**, are mathematically similar.
The total surface area of cuboid **S** is 157 cm^2 and the total surface area of cuboid **T** is 2512 cm^2.

(a) The length of cuboid **T** is 26 cm.
Calculate the length of cuboid **S**.

..... cm
(3)

(b) The volume of cuboid **S** is 130 cm^3.
Calculate the volume of cuboid **T**.

..... cm^3
(2)

Q21

(Total 5 marks)

Leave blank

22. Simplify fully $\frac{2}{x-1}+\frac{x-11}{x^2+3x-4}$

.....

Q22

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

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