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 5 November 2009 – 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 25 questions in this question paper. The total mark for this paper is 100.
There are 24 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.

Printer's Log. No.
H34884A
W850/U4400/57570 5/4/6/4/

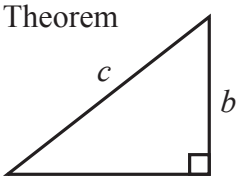
H 3 4 8 8 4 A 0 1 2 4

Turn over

edexcel
advancing learning, changing lives

IGCSE MATHEMATICS 4400
FORMULA SHEET – HIGHER TIER

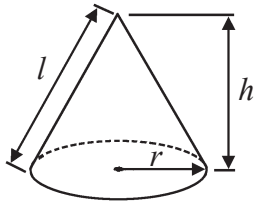
Pythagoras' Theorem



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

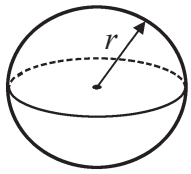
Volume of cone = $\frac{1}{3}\pi r^2 h$

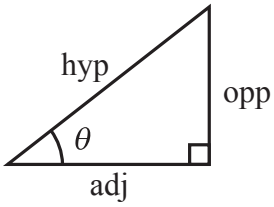
Curved surface area of cone = $\pi r l$



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

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





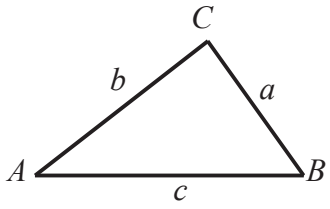
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

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

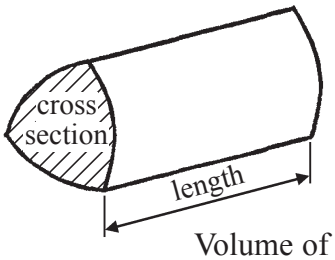
In any triangle ABC



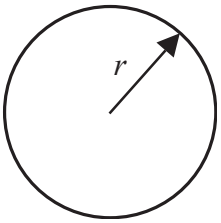
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



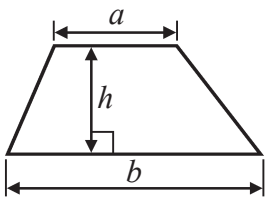
Volume of prism = area of cross section × length

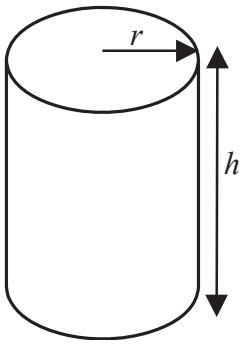


Circumference of circle = $2\pi r$

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 FIVE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Show that $\frac{2}{3}+\frac{1}{5}=\frac{13}{15}$

Q1

(Total 2 marks)

2. Solve $8y - 9 = 5y + 3$

$y =$ .....

Q2

(Total 3 marks)

Leave blank

3. (a) The diagram shows a regular octagon, with centre O.

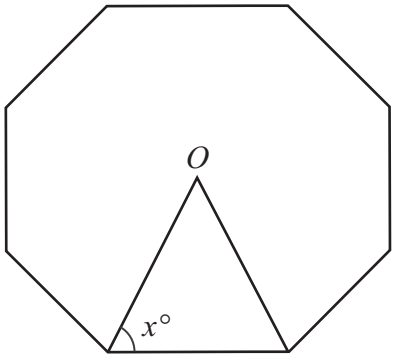


Diagram **NOT** accurately drawn

Work out the value of x.

$x =$ .....

(3)

(b) A regular polygon has an exterior angle of 30°.
Work out the number of sides of the polygon.

.....

(2) **Q3**

(Total 5 marks)

Leave blank

4. In a survey of 36 families, the number of people in each family was recorded. The table shows the results.

Number of people in the family	Frequency
1	3
2	2
3	7
4	13
5	11

Work out the mean number of people in these 36 families.

.....

Q4

(Total 3 marks)

Leave blank

5. Cups cost x dollars each.
Mugs cost $(x + 2)$ dollars each.

(a) Write down an expression, in terms of x, for the total cost of 12 cups and 6 mugs.

..... dollars
(2)

(b) The total cost of 12 cups and 6 mugs is 57 dollars.
Work out the cost of 1 cup.

..... dollars
(2)

Q5

(Total 4 marks)

Leave blank

6. (a) $S = \{1, 3, 5, 7\}$
$T = \{2, 3, 7, 11\}$

How many members are there in $S \cup T$?

.....

(1)

(b) $U = \{3, 4, 5\}$
$U \cup V = \{1, 2, 3, 4, 5\}$

The set V has as few members as possible.
List the members of the set V.

.....

(1)

(c) $A = \{\text{Cats}\}$
$B = \{\text{Black animals}\}$

Describe the members of $A \cap B$.

.....

(1) **Q6**

(Total 3 marks)

Leave blank

7. (a) Calculate the circumference of a circle of radius 30 cm.
Give your answer correct to 3 significant figures.

..... cm
(2)

(b) The diagram shows a circle with radius 2.1 cm inside a square.
The circle touches the sides of the square.

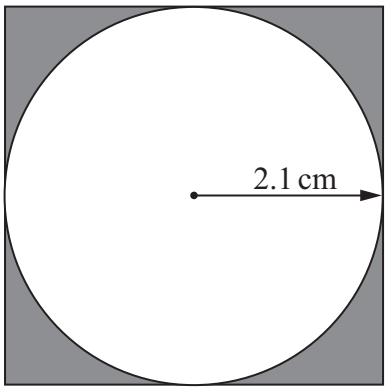


Diagram **NOT** accurately drawn

Work out the shaded area.
Give your answer correct to 3 significant figures.

..... cm^2
(4)

Q7

(Total 6 marks)

Leave blank

8. James throws a biased dice once.
The table shows all the possible scores and their probabilities.

Score	Probability
1	0.4
2	0.3
3	0.1
4	0.1
5	0.05
6	0.05

Find the probability that the score is more than 3

.....

(Total 2 marks)

Q8

Leave blank

9. (a) Expand and simplify fully $2(w - 3) + 3(w + 5)$

.....

(2)

(b) Solve the equation $\frac{x+5}{3} = 9$

$x =$ .....

(2)

(c) Solve the inequality $5y + 7 < 13$

.....

(2)

Q9

(Total 6 marks)

Leave blank

10. The diagram shows a prism.
The cross section of the prism is a right-angled triangle.
The lengths of the sides of the triangle are 8 cm, 15 cm and 17 cm.
The length of the prism is 20 cm.
Work out the total surface area of the prism.

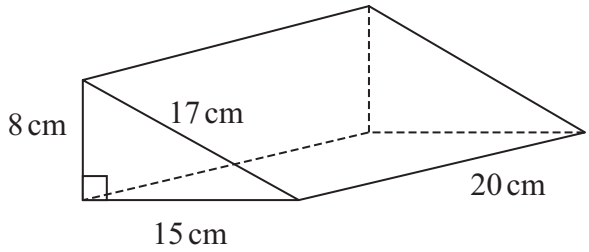


Diagram **NOT** accurately drawn

..... cm^2

Q10

(Total 3 marks)

11. Make a the subject of $P = \sqrt{ab}$

$a =$ .....

Q11

(Total 2 marks)

Leave blank

12. (a)

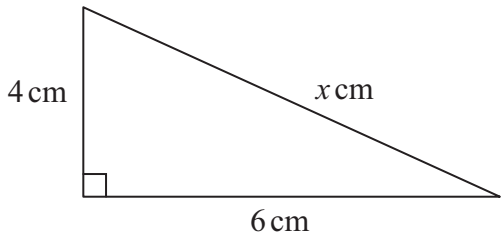


Diagram **NOT** accurately drawn

Calculate the value of x.
Give your answer correct to 3 significant figures.

$x =$ .....

(3)

(b)

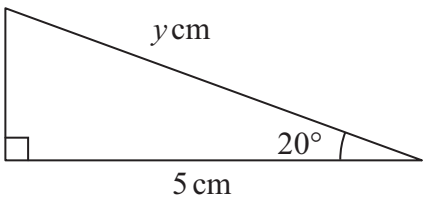


Diagram **NOT** accurately drawn

Calculate the value of y.
Give your answer correct to 3 significant figures.

$y =$ .....

(3)

Q12

(Total 6 marks)

Leave blank

13. The table shows the area, in km^2, of some countries.

Country	Area (km^2)
Algeria	2.4×10^6
Botswana	6.0×10^5
Equatorial Guinea	2.8×10^4
Ethiopia	1.2×10^6
Malawi	1.2×10^5

(a) Which of these countries has the largest area?

.....

(1)

(b) How many times greater is the area of Ethiopia than the area of Malawi?

.....

(1)

(c) Work out the total area of all five countries.
Give your answer in standard form.

..... km^2

(2)

Q13

(Total 4 marks)

Leave blank

14. Solve the simultaneous equations

$$2x - 3y = 3$$
$$3x + 6y = 1$$

$x =$ .....

$y =$ .....

Q14

(Total 3 marks)

15. Jothi bought a car.
Later, Jothi sold the car for £2125
He made a loss of 15%.
Work out the original price of the car.

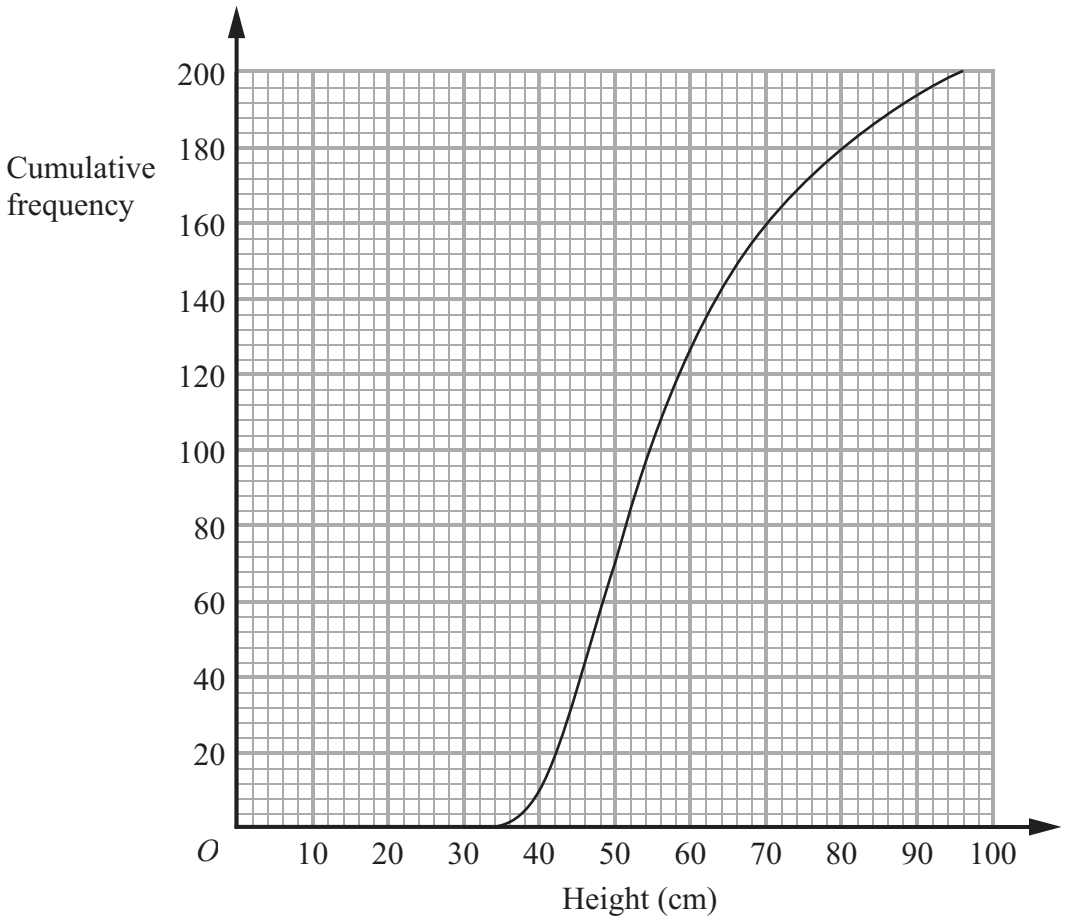
£ .....

Q15

(Total 3 marks)

Leave blank

16. The cumulative frequency diagram shows information about the heights, in centimetres, of 200 plants.



(a) Find an estimate for the median height.

..... cm

(2)

(b) Work out an estimate for the number of plants whose heights are greater than 80 cm.

.....

(2) **Q16**

(Total 4 marks)

Leave blank

17. (a) Factorise $x^2 - y^2$

.....

(1)

(b) Factorise completely $(c + d)^2 - d^2$

.....

(2)

(c) Factorise $2w^2 + w - 3$

.....

(2)

Q17

(Total 5 marks)

Leave blank

18. In the diagram, a sector of a circle of radius 12 cm is shaded.
The area of the sector is 112π cm^2.
Calculate the value of x.

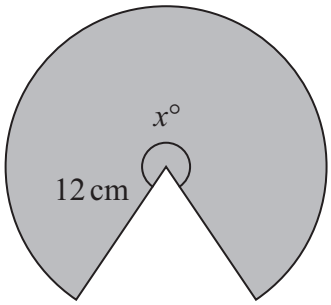


Diagram **NOT** accurately drawn

x = ...

Q18

(Total 4 marks)

Leave blank

19. (a) Simplify $\dfrac{x^2}{x^2-2x}$

.....

(2)

(b) Simplify $\dfrac{2}{2x-1}-\dfrac{1}{x+1}$

.....

(4)

Q19

(Total 6 marks)

Leave blank

20. Each time Jeni plays a computer game the probability that she will win is $\frac{2}{3}$

Jeni plays the computer game 3 times.

Calculate the probability that Jeni will win

(a) all 3 games,

.....

(2)

(b) exactly 2 out of the 3 games.

.....

(3)

Q20

(Total 5 marks)

Leave blank

21. t is proportional to the square root of d.

$t = 12$ when $d = 4$

(a) Find a formula for t in terms of d.

.....

(3)

(b) Calculate the value of t when $d = 9$

$t =$ .....

(2) **Q21**

(Total 5 marks)

Leave blank

22. The diagram shows the positions of two ships, A and B, and a lighthouse L.

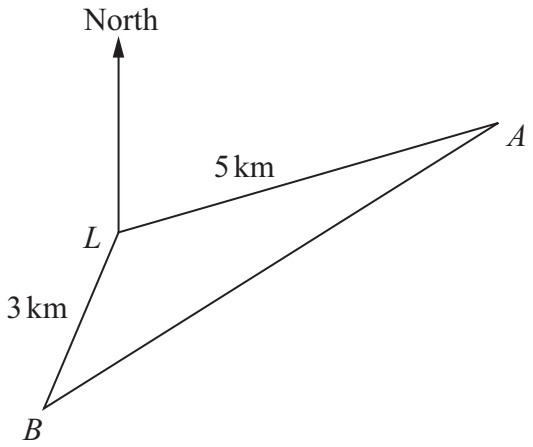


Diagram **NOT** accurately drawn

Ship A is 5 km from L on a bearing of 070° from L.
Ship B is 3 km from L on a bearing of 210° from L.
Calculate the distance between ship A and ship B.
Give your answer correct to 3 significant figures.

..... km

Q22

(Total 3 marks)

Leave blank

23. In a race, Paula runs 25 laps of a track.
Each lap of the track is 400 m, correct to the nearest metre.
Paula's average speed is 5.0 m/s, correct to one decimal place.

Calculate the upper bound for the time that Paula takes to run the race.
Give your answer in minutes and seconds, correct to the nearest second.

.....

Q23

(Total 4 marks)

Leave blank

24. $f(x) = x^2$
$g(x) = x - 3$

(a) (i) Find $gf(x)$

.....

(ii) Find $g^{-1}(x)$

.....

(2)

(b) Solve the equation $gf(x) = g^{-1}(x)$

.....

(3) **Q24**

(Total 5 marks)

Leave blank

25. (a) $(\sqrt{a})^7 = k\sqrt{a}$, where $k = a^n$
Find the value of n.

$n =$ .....

(2)

(b) Express $\dfrac{1}{2\sqrt{2}}$ as a power of 2

.....

(2)

Q25

(Total 4 marks)

TOTAL FOR PAPER: 100 MARKS

END