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IGCSE

London Examinations IGCSE

Mathematics (4400)

First examination May 2004

July 2003, Issue 1

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Specimen Papers and Mark Schemes

London Examinations IGCSE

Mathematics (4400)

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Authorised by Elizabeth Blount

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Specimen Papers

Mark Schemes and Specification Grids

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This information is given to be of use to teachers and it will **NOT** appear on the examination paper when this Specification is first assessed in April/May 2004.

Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	4	0	0	/	1	F	Signature	

Paper Reference(s)

4400/1F

Examiner's use only

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London Examinations IGCSE

Mathematics

Paper 1F

Foundation Tier

Specimen Paper

Time: 2 hours

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number and 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 and write the paper reference for which you have been entered.
Answer **ALL** the questions in the spaces provided in this question paper.

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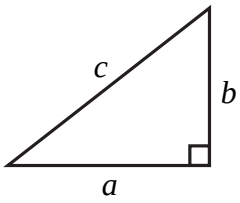
IGCSE MATHEMATICS 4400

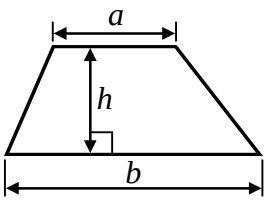
FORMULA SHEET – FOUNDATION TIER

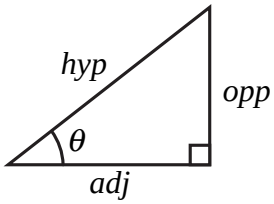
Pythagoras' Theorem

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



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





adj = hyp × cos θ

opp = hyp × sin θ

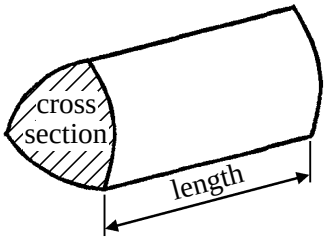
opp = adj × tan θ

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

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

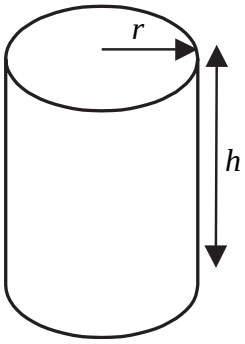
$\tan\theta = \frac{\text{opp}}{\text{adj}}$

Volume of prism = area of cross section × length



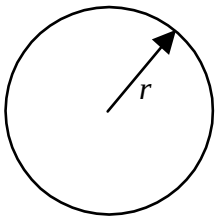
Circumference of circle = $2\pi r$

Area of circle = πr^2



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

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

Leave blank

1. Here is a list of numbers.

8 9 10 11 12 13 14 15 16

From the list, write down

(a) the **two** numbers that are multiples of 5,

.....

(1)

G 1.1

(b) the **two** numbers that are factors of 24,

.....

(1)

G 1.1

(c) a square number,

.....

(1)

G 1.4

(d) a prime number.

.....

(1)

E 1.1

(Total 4 marks)

2. Here are the first five terms of a number sequence.

6 10 14 18 22

(a) Write down the next two terms in the sequence.

..... , ...

(1)

G 3.1

(b) Explain how you found your answer.

.....

(1)

F 3.1

(c) Explain why 675 is **not** a term of this number sequence.

.....

.....

(1)

F 3.1

(Total 3 marks)

Page Total

Turn over

3. The table shows the temperature in six cities on one day.

Leave blank

City	Nicosia	Paris	London	Moscow	Nairobi	Berlin
Temperature °C	13	–6	0	–21	23	–7

(a) Which city has the lowest temperature?

G 1.1

.....

(1)

(b) List the temperatures in order of size.
Start with the lowest temperature.

.....

(2)

(c) Work out the difference in temperature between Nairobi and Paris.

F 1.1

.....°C

(1)

In the next four hours, the temperature in Berlin increased by 8 °C.

(d) Work out the new temperature in Berlin.

F 1.1

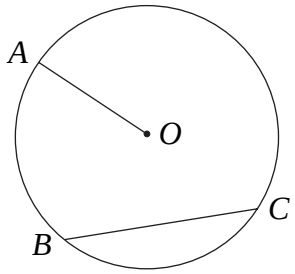
.....°C

(1)

(Total 5 marks)

---

4. The points *A*, *B* and *C* lie on the circumference of a circle, centre *O*.



Write down the special name for

(i) the line *OA*,

.....

(ii) the line *BC*.

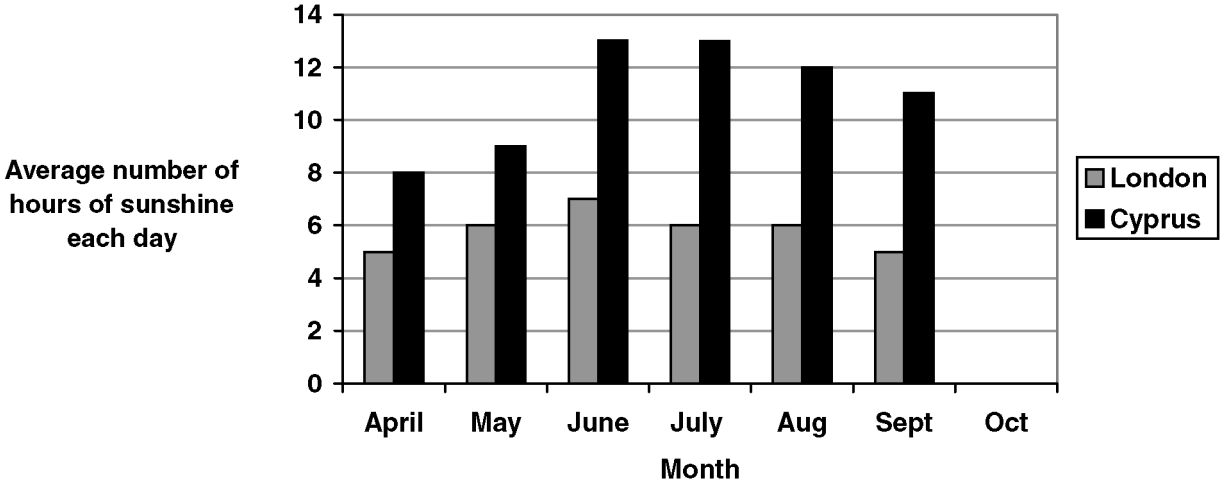
G 4.6

.....

(Total 2 marks)

5. The bar chart shows the average number of hours of sunshine each day in London and in Cyprus each month from April to September.

Leave blank



(a) Write down the average number of hours of sunshine each day in London in August.

G 6.1

.....

(1)

(b) Write down the average number of hours of sunshine each day in Cyprus in September.

G 6.1

.....

(1)

(c) Write down the name of the month in which the average number of hours of sunshine each day in London was 7.

G 6.1

.....

(1)

In October, the average number of hours of sunshine each day in London is 3 hours. In Cyprus, it is 9 hours.

(d) Draw two bars to show this information on the bar chart.

G 6.1

(1)

There are 30 days in September.

(e) Work out the **total** number of hours of sunshine in Cyprus in September.

F 6.2

..... hours

(2)

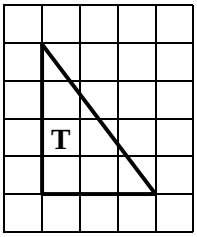
(Total 6 marks)

Page Total

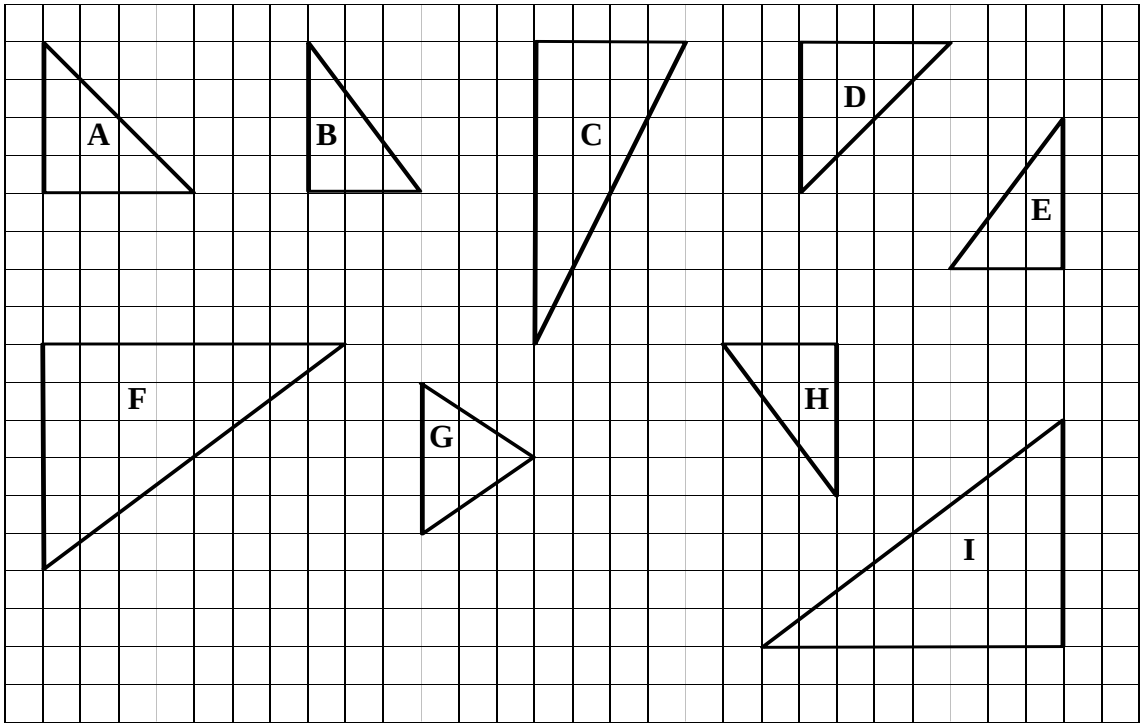
Turn over

6. Here is a triangle **T**.

Leave blank



Here are nine more triangles.



(a) Write down the letters of the three triangles that are congruent to the triangle **T**.

.....

(2)

G
4.2

(b) (i) Write down the letter of the triangle that is an enlargement of triangle **T**.

.....

(ii) Find the scale factor of the enlargement.

.....

(2)

F
5.2

(Total 4 marks)

7. This word formula can be used to work out the perimeter of a rectangle.

Leave blank

Perimeter = 2 × length + 2 × width

(a) Work out the perimeter of a rectangle with a length of 12 cm and a width of 7 cm.

..... cm
(2)

G 2.3

(b) Work out the width of a rectangle with a perimeter of 50 cm and a length of 16 cm.

..... cm
(3)

F 2.3

(Total 5 marks)

---

8. (a) (i) Find the value of 6.7^2

.....

F 1.4

(ii) Write your answer to part (i) correct to 1 significant figure.

.....
(2)

E 1.9

(b) Find the value of $\sqrt{75.69}$

.....
(1)

F 1.4

(c) Find the cube of 12

.....
(1)

F 1.4

(d) Find the value of $58 + (7.6 + 2.4)^3$

.....
(2)

E 1.4

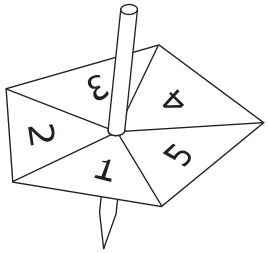
(Total 6 marks)

Page Total

Turn over

9. Here is a 5-sided spinner.

Leave blank



Its sides are labelled 1, 2, 3, 4 and 5.

Alan spins the spinner and throws a coin.
One possible outcome is (3, Heads).

(a) List all the possible outcomes.

.....

.....

.....

(2)

F 6.3

The spinner is biased.
The probability that the spinner will land on each of the numbers 1 to 4 is given in the table.

Number	1	2	3	4	5
Probability	0.36	0.1	0.25	0.15	

Alan spins the spinner once.

(b) Work out the probability that the spinner will land on 5.

.....

(2)

D 6.3

Bhavana spins the spinner 50 times.

(c) Work out an estimate for the number of times the spinner will land on 1.

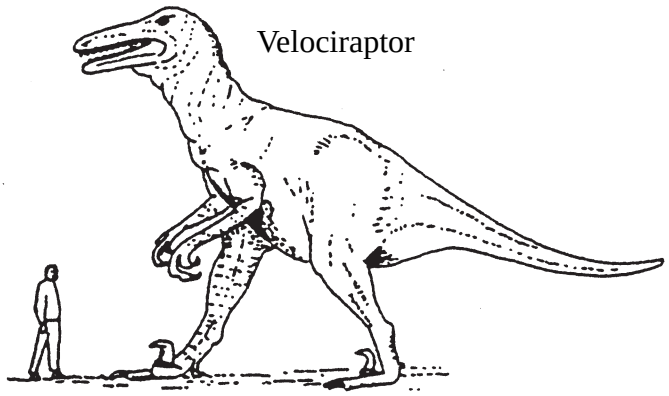
.....

(2)

D 6.3

(Total 6 marks)

10.



Man (to scale)

The scale diagram shows a man and a dinosaur called a velociraptor.
The man is of average height.

(a) Write down an estimate for the height of the man.
Give your answer in metres.

..... m
(1)

F 4.4

(b) Estimate the height of the velociraptor.
Give your answer in metres.

..... m
(2)

F 4.4

(Total 3 marks)

11. (a) Simplify $4b + 2c + 3b - 6c$

.....
(2)

E 2.2

(b) Factorise $x^2 + 8x$

.....
(2)

D 2.2

(Total 4 marks)

Page Total

Leave blank

Turn over

Leave blank

12. (a) Work out $\frac{4}{5}$ of 85

F 1.2

.....

(2)

(b) Work out $\frac{8}{9} - \frac{2}{3}$

E 1.2

.....

(2)

(c) Work out $\frac{8}{9} \div \frac{2}{3}$
Give your answer as a mixed number.

.....

(2)

(Total 6 marks)

---

13. A cuboid has
a volume of 56 cm^3,
a length of 4 cm,
a width of 2 cm.

Work out the height of the cuboid.

E 4.9

..... cm

(Total 2 marks)

14. Here is a sketch of a triangle.

Leave blank

$PR = 6.4$ cm
$QR = 7.7$ cm
Angle $R = 35°$

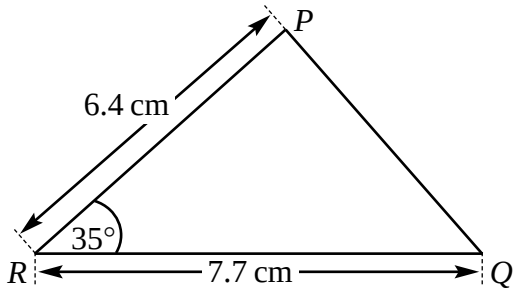


Diagram **NOT** accurately drawn

(a) In the space below, make an accurate drawing of the triangle.

E 4.5

(3)

(b) Use a ruler and compasses to construct, on your drawing, the bisector of angle Q. Show all your construction lines.

C 4.5

(2)

(Total 5 marks)

Page Total

Turn over

15.

Leave blank

Illustration **NOT** drawn to scale

This rule is used to find how far apart to plant two bushes.

> Add the heights of the bushes.
> Divide your answer by three.

Aroshe is going to plant two bushes.
The heights of the bushes are 46 cm and 20 cm.

(a) Use the rule to work out how far apart Aroshe should plant the bushes.

G 2.3

..... cm
(2)

Ben is going to plant two different bushes.
He should plant them 50 cm apart.
The height of one of the bushes is 90 cm.

(b) Work out the height of the other bush.

E 2.4

..... cm
(3)

The heights of two different bushes are a cm and b cm.
The two bushes should be planted d cm apart.

(c) Write down a formula for d in terms of a and b.

D 2.3

.....
(3)

(Total 8 marks)

Leave blank

16. Asif has a box of 18 pens.
9 of the pens are blue.
5 of the pens are black.
The rest of the pens are red.

Asif is going to choose one pen at random from the box.

(a) Find the probability that Asif will choose

(i) a blue pen,

.....

(ii) a red pen.

.....

(2)

E 6.3

(b) Find the probability that Asif will choose a blue pen **or** a red pen.

.....

(2)

C 6.3

Asif removes one blue pen, one black pen and one red pen from the box.
He does not replace them.
He then says, "If I choose a pen now, the probability that I will choose a blue pen is the same as it was before I removed the pens."

(c) Is Asif right?
Show working to justify your answer.

(2)

E 6.3

(Total 6 marks)

17. The population of a village was 1750.
The population fell by 12%.
Work out the new population.

.....

(Total 3 marks)

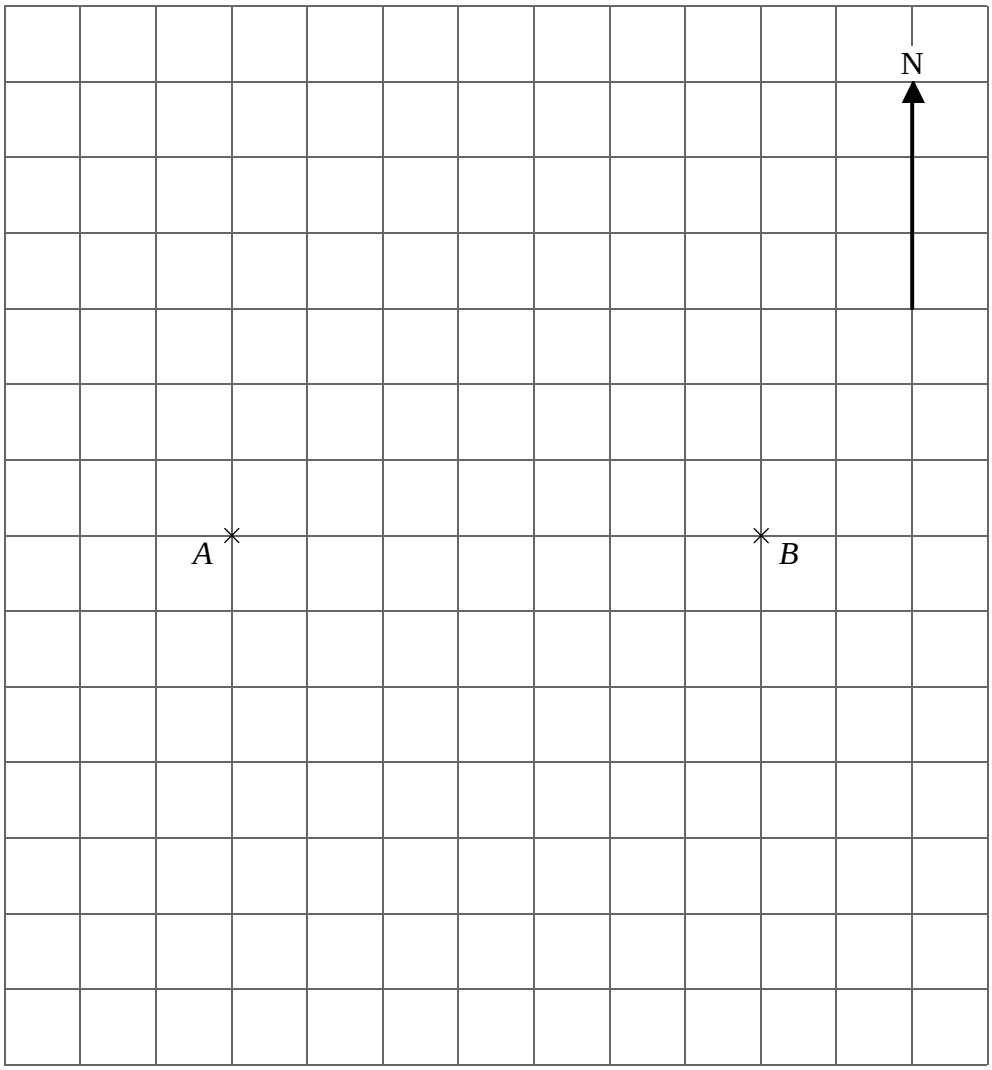
D 1.6

Page Total

Turn over

18. The grid represents part of a map.

Leave blank



The point *C* is on a bearing of 137° from the point marked *A* and on a bearing of 213° from the point marked *B*.

On the grid, mark, with a cross (×), the position of the point *C* and label it with the letter *C*.

E/D 4.4

(Total 3 marks)

19.

Leave blank

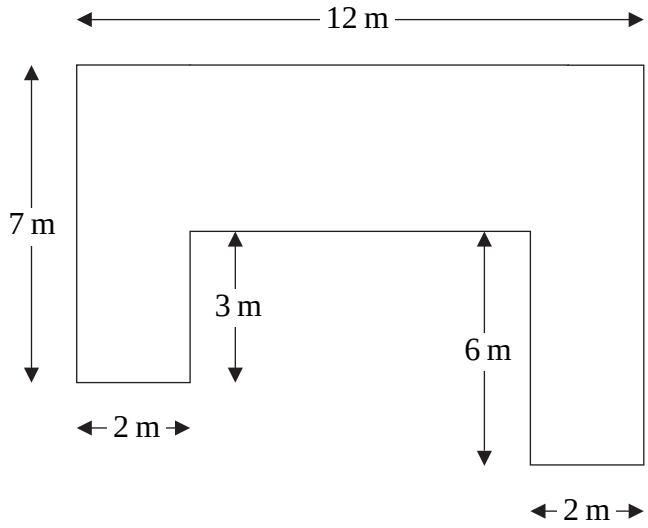


Diagram **NOT** accurately drawn

The diagram shows a paved surface.
All the corners are right angles.
Work out the area of the paved surface.
State the units of your answer.

D
4.9

.....

(Total 4 marks)

20. Kate drove 132 miles in 2 hours 24 minutes.
Work out her average speed in miles per hour.

C
1.10/4.4

..... miles per hour

(Total 3 marks)

Page Total

Turn over

Leave blank

21.

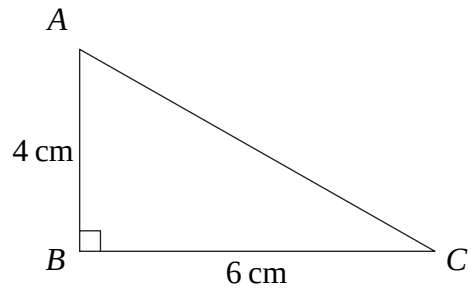


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AB = 4 cm, *BC* = 6 cm.

Calculate the length of *AC*.
Give your answer correct to 3 significant figures.

C 4.8

..... cm

(Total 3 marks)

---

22. Mortar is made from cement, lime and sand.
The ratio of their weights is 2 : 1 : 9

Work out the weight of cement and the weight of sand in 60 kg of mortar.

C 1.7

cement ..... kg

sand ..... kg

(Total 3 marks)

Leave blank

23. The length of a rod is 98 cm correct to the nearest centimetre.

(a) Write down the minimum length the rod could be.

..... cm
(1)

(b) Write down the maximum length the rod could be.

C 1.8

..... cm
(1)

(Total 2 marks)

---

24. $\mathscr{E}$ = {Integers}
$A = \{1, 2, 3, 6\}$
$B = \{4, 5\}$
$C = \{x : 6 \leq 3x < 18\}$

(a) List the elements of the set

(i) $A \cup B$,

.....

(ii) C.

C 1.5

.....
(3)

(b) Find $A \cap B$.

C 1.5

.....
(1)

(Total 4 marks)

Page Total

TOTAL FOR PAPER: 100 MARKS

END

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Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	4	0	0	/	2	F	Signature	

Paper Reference(s)

4400/2F

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Team Leader's use only

London Examinations IGCSE

Mathematics

Paper 2F

Foundation Tier

Specimen Paper

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IGCSE MATHEMATICS 4400

FORMULA SHEET – FOUNDATION TIER

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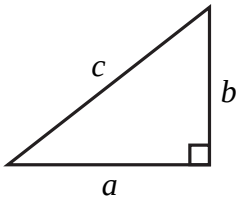

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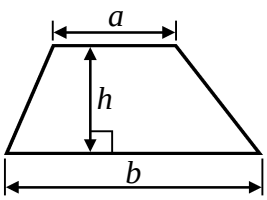
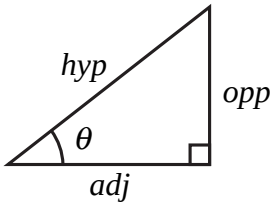




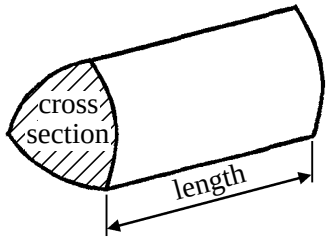
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

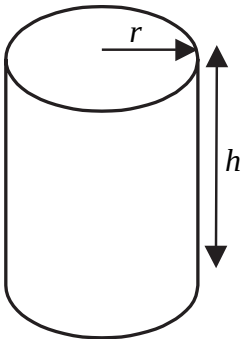
$\tan\theta = \frac{\text{opp}}{\text{adj}}$

Volume of prism = area of cross section × length



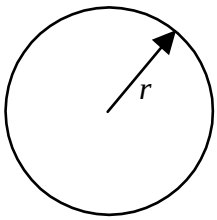
Circumference of circle = $2\pi r$

Area of circle = πr^2



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

Curved surface area of cylinder = $2\pi rh$



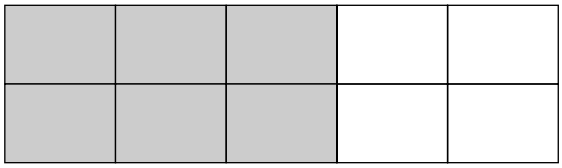
Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

Leave blank

1.



(a) Write down the fraction of this shape which is shaded.

G 1.2

..... **(1)**

(b) Write down the percentage of this shape which is shaded.

G 1.6

..... % **(1)**

(c) Which of these fractions are **not** equivalent to $\frac{2}{3}$?

$\frac{3}{4}$ $\frac{4}{6}$ $\frac{7}{8}$ $\frac{6}{9}$ $\frac{8}{12}$

G 1.2

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

(Total 4 marks)

---

2. 5.08 7.8 5.3 7.35 7.21

(a) List these numbers in order of size.
Start with the smallest number.

G 1.3

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

(b) Write 0.35 as a fraction.
Give your answer in its simplest form.

F 1.3

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

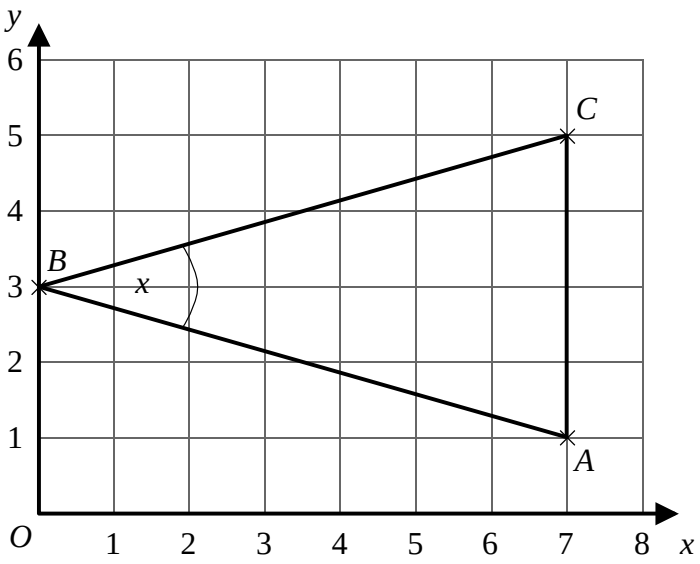
(Total 4 marks)

Page Total

Turn over

3. The diagram shows a triangle *ABC* on a centimetre grid.

Leave blank



(a) Write down the co-ordinates of the point

(i) *A*, (....., ...)

(ii) *B*. (....., ...)

(2)

G 3.3

(b) Write down the special name for triangle *ABC*.

.....

(1)

G 4.1

(c) Measure the length of the line *AB*.
Give your answer in millimetres.

..... mm

(1)

G 4.4

(d) (i) Measure the size of angle *x*.

°

.....

F 4.4

(ii) Write down the special name that is given to this type of angle.

.....

(2)

G 4.1

(e) Draw **one** line of symmetry on the triangle.

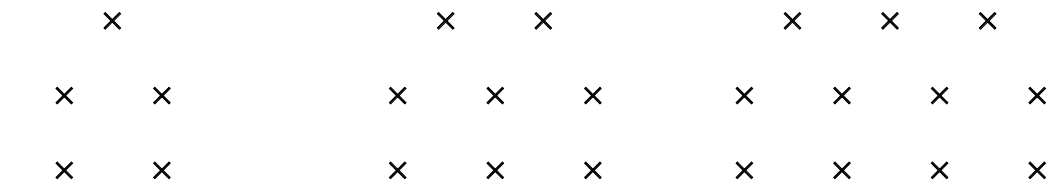
(1)

G 4.3

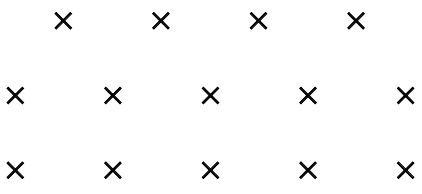
(Total 7 marks)

4. Here are some patterns made with crosses.

Leave blank



Pattern Number 1 Pattern Number 2 Pattern Number 3



Pattern Number 4

(a) Draw Pattern Number 5.

G 3.1

(1)

(b) Complete the table for Pattern Number 5 and Pattern Number 6.

Pattern Number	1	2	3	4	5	6
Number of crosses	5	8	11	14		

G 3.1

(1)

(c) Work out the Pattern Number that has 26 crosses.

Pattern Number.....

F 3.1

(1)

(d) Work out the number of crosses in Pattern Number 10.

..... crosses

F 3.1

(2)

(Total 5 marks)

Page Total

Turn over

Leave blank

5. Here are Jason's maths homework marks for his last 10 homeworks.

8 6 4 8 1 10 8 4 9 5

(a) Write down the modal mark.

G 6.2

.....

(1)

(b) Work out the median mark.

G 6.2

.....

(2)

(c) Work out the range of the marks.

F 6.2

.....

(1)

(d) Work out the mean mark.

F 6.2

.....

(3)

(Total 7 marks)

6.

(a) Write down the special name of this quadrilateral.

G 4.2

.....

(1)

(b) Write down the number of lines of symmetry this quadrilateral has.

F 4.3

.....

(1)

(c) Write down the order of rotational symmetry of this quadrilateral.

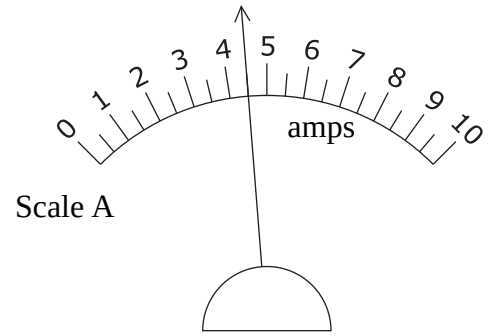
F 4.3

.....

(1)

(Total 3 marks)

7.

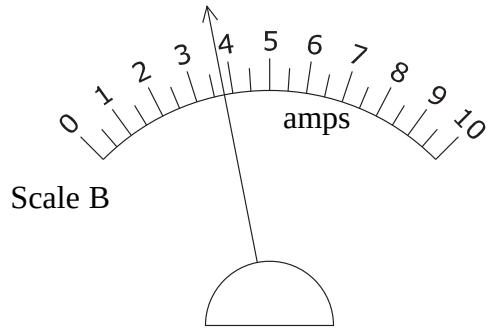


Scale A

(a) What is the reading on Scale A?

..... amps
(1)

G 4.4



Scale B

(b) What is the reading on Scale B?

..... amps
(1)

G 4.4

(Total 2 marks)

---

8. Jo did a maths test.
There was a total of 40 marks for the test.
Jo got 65% of the marks.

(a) Work out 65% of 40.

.....
(2)

F 1.6

Jo got 36 out of 80 in an English test.

(b) Work out 36 out of 80 as a percentage.

%
.....
(2)

D 1.6

(Total 4 marks)

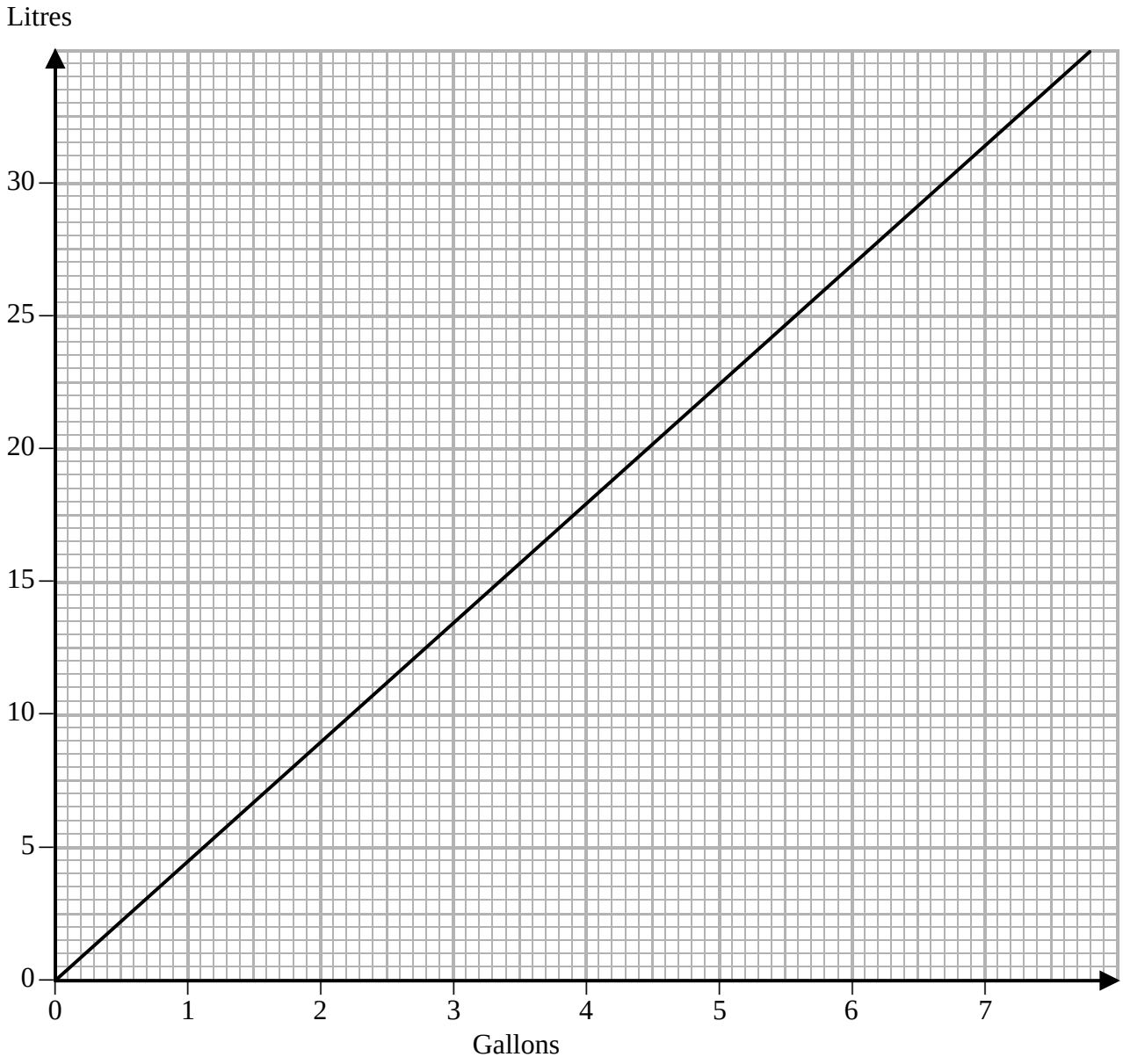
Page Total

Turn over

Leave blank

9. Conversion graph for litres and gallons.

Leave blank



Use the conversion graph to convert

(i) 4 gallons to litres,

..... litres

(ii) 1.9 gallons to litres,

..... litres

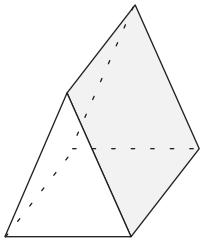
(iii) 26 litres to gallons.

..... gallons

(Total 3 marks)

F
3.3

10.



Leave blank

For this solid, write down

(i) the number of faces,

..... F 4.9

(ii) the number of edges.

.....

(Total 2 marks)

---

11. Elena goes on holiday to New York.
The exchange rate is £1 = 1.545 dollars.
She changes £800 into dollars.

(a) How many dollars should she get?

..... dollars E 1.10
(2)

After her holiday, Elena changes 120 dollars back into pounds.
The exchange rate is the same.

(b) How much money should she get?
Give your answer to the nearest penny.

£ ..... E 1.10
(2)

(Total 4 marks)

Page Total

Turn over

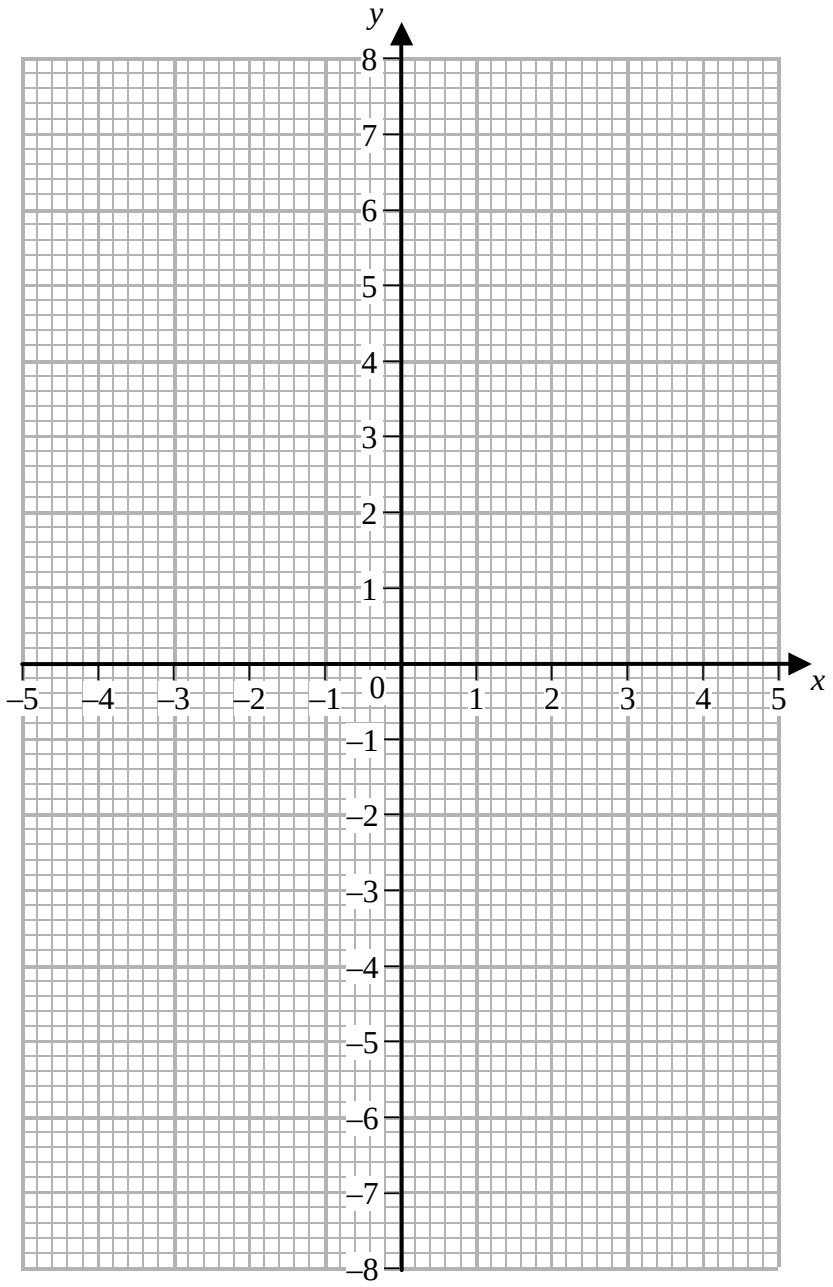
12. (a) Complete this table of values for $y = 3x - 1$.

Leave blank

x	–2	–1	0	1	2	3
y			–1			8

(2)

(b) On the grid, draw the graph of $y = 3x - 1$.



(2)

(c) Use your graph to find the value of x when $y = 3.5$

$x =$ .....

(1)

(Total 5 marks)

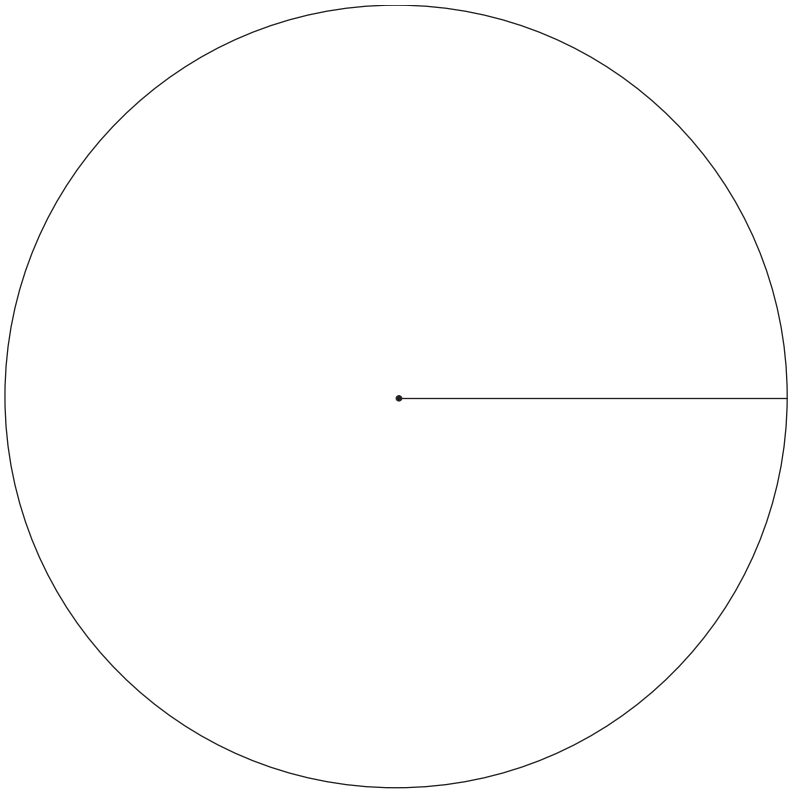
E 3.3

13. 40 passengers at Dubai Airport were asked which country they were flying to. Here is a frequency table which shows that information.

Leave blank

Country	Number of passengers	
USA	14	
France	9	
Spain	12	
Greece	5	

Draw an accurate pie chart to show this information.
Use the circle below.



(Total 4 marks)

Page Total

Turn over

14.

Leave blank

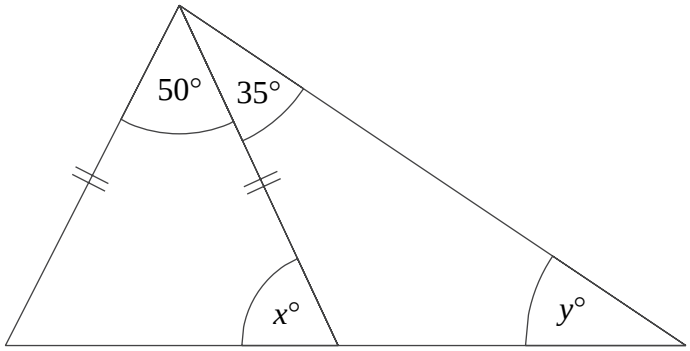


Diagram **NOT** accurately drawn

(a) (i) Work out the size of the angle marked $x°$.

° .....

(ii) Give reasons for your answer.

.....

.....

(2)

E 4.1

(b) (i) Work out the size of the angle marked $y°$.

° .....

(ii) Give a reason for your answer.

.....

.....

(2)

E 4.1

(Total 4 marks)

---

15. 30% $\frac{1}{4}$ 0.37 $\frac{1}{3}$ $\frac{2}{5}$ 0.299

List these numbers in order of size.
Start with the smallest number.

.....

(Total 3 marks)

E 1.3

16. This is a recipe for making a Tuna Bake for **4** people.

Leave blank

Tuna Bake

Ingredients for **4** people.

400 g of tuna
400 g of mushroom soup
100 g of grated cheddar cheese
4 spring onions
250 g of breadcrumbs

Work out the amounts needed to make a Tuna Bake for **10** people.

…….. g of tuna

…….. g of mushroom soup

…….. g of grated cheddar cheese

…….. spring onions

…….. g of breadcrumbs

D
1.7

(Total 3 marks)

Page Total

Turn over

17. (a) Solve $5x - 7 = 2x + 11$

Leave blank

$x =$ .....

(3)

D 2.4

(b) Solve $\frac{16 - y}{3} = 3$

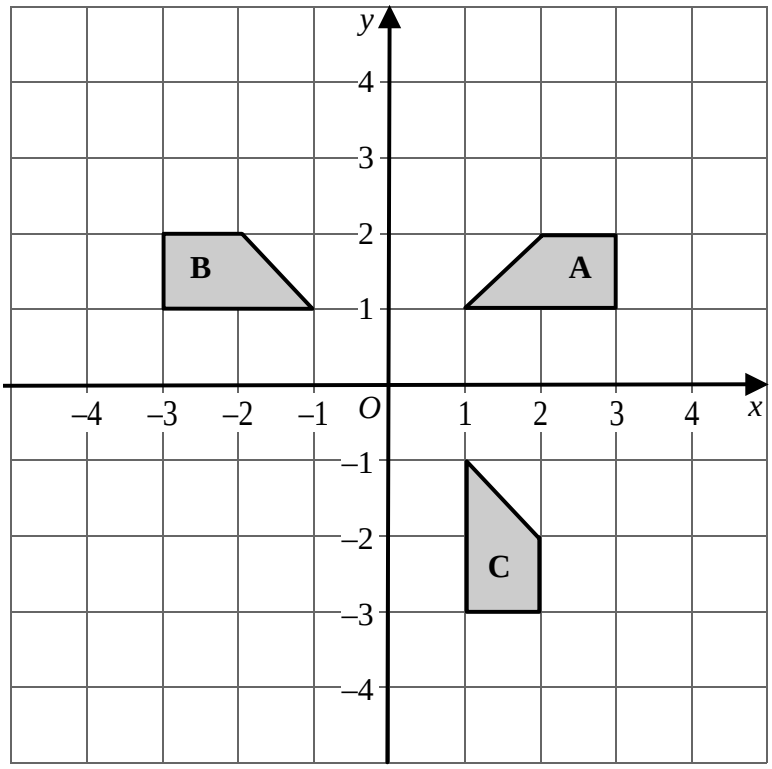
$y =$ .....

(3)

C 2.4

(Total 6 marks)

18.



(a) Describe fully the single transformation which takes shape **A** onto shape **B**.

.....

(2)

D 5.2

(b) Describe fully the single transformation which takes shape **A** onto shape **C**.

.....

(3)

D 5.2

(Total 5 marks)

---

19. Work out the value of $\sqrt{\dfrac{83.5\times978}{1025+222}}$

Give your answer correct to 3 significant figures.

.....

(Total 3 marks)

C 1.11

Page Total

Leave blank

Turn over

Leave blank

20. (a) Expand

(i) $3(2c + 5)$

.....

(ii) $y(y - 5)$

D 2.2

.....

(2)

(b) Factorise $15m + 10$

D 2.2

.....

(1)

(c) Expand and simplify $(x + 5)(x - 3)$

C 2.2

.....

(2)

(Total 5 marks)

---

21. Express 72 as the product of powers of its prime factors.

C 1.4

.....

(Total 3 marks)

22. The table gives information about the weights, in kilograms, of 100 donkeys.

Leave blank

Weight of donkeys (w kg)	Frequency
$65 < w \leq 70$	4
$70 < w \leq 75$	10
$75 < w \leq 80$	34
$80 < w \leq 85$	32
$85 < w \leq 90$	16
$90 < w \leq 95$	4

(a) Write down the modal class interval.

D 6.2

..... **(1)**

(b) Work out the class interval which contains the median.

C 6.2

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

(c) Work out an estimate for the mean weight of the donkeys.

C 6.2

..... kg **(4)**

(Total 7 marks)

Page Total

Turn over

23.

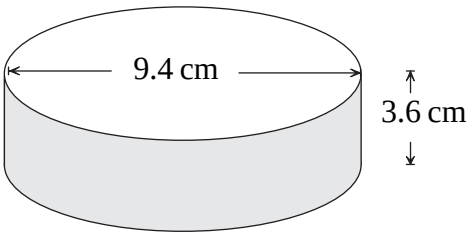


Diagram **NOT** accurately drawn

Leave blank

The diameter of a cylinder is 9.4 cm. Its height is 3.6 cm.

(a) Work out the area of one of the circular ends of the cylinder.
Give your answer correct to 3 significant figures.

..... cm^2
(2)

D 4.9

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

..... cm^3
(2)

C 4.9

(Total 4 marks)

24.

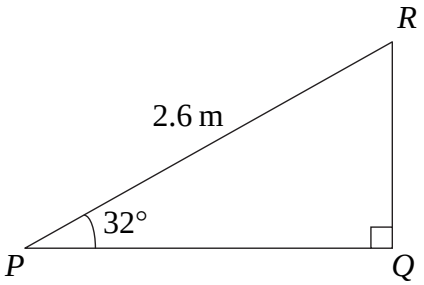


Diagram **NOT** accurately drawn

Angle $Q = 90°$. Angle $P = 32°$. $PR = 2.6$ m.

Calculate the length of QR. Give your answer correct to 3 significant figures.

..... m

C 4.8

(Total 3 marks)

Page Total

TOTAL FOR PAPER: 100 MARKS

END

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

Specimen Paper

Time: 2 hours

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number and 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 and write the paper reference for which you have been entered.
Answer **ALL** the questions in the spaces provided in this question paper.
Show all the steps in any calculations and state the units.

Information for Candidates

There are 16 pages in this question paper. All blank pages are indicated.
The total mark for this paper is 100. The marks for the various parts of questions are shown in round brackets, e.g. **(2)**.
You may use a calculator.
A formula sheet is printed on the inside cover of this question paper.

Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.
Work steadily through the paper.
Do not spend too long on one question.
Show all stages in any calculations.
If you cannot answer a question, leave it and attempt the next one. Return at the end to those you have left out.

Turn over

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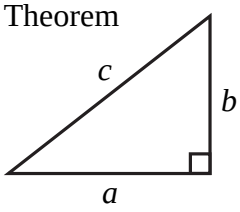
London Examinations
from Edexcel International

IGCSE MATHEMATICS 4400
FORMULA SHEET – HGHER TIER

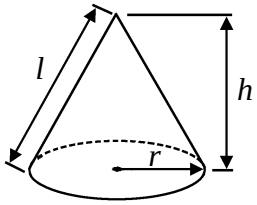
Pythagoras' Theorem



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

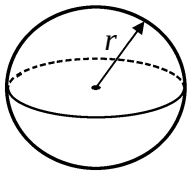
Volume of cone = $\frac{1}{3}\pi r^2 h$

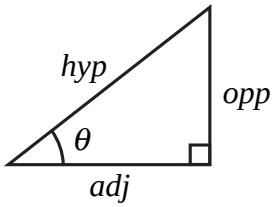
Curved surface area of cone = $\pi r l$



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

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





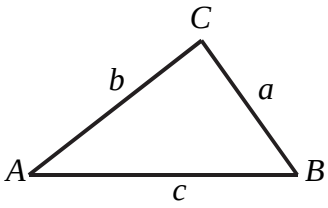
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

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

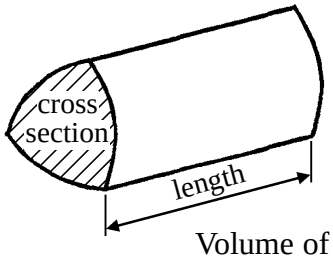
In any triangle *ABC*



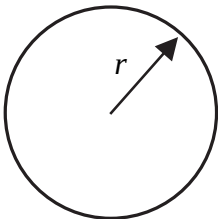
Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



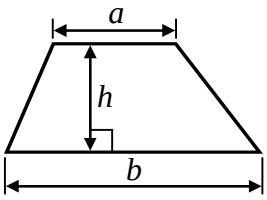
Volume of prism = area of cross section × length

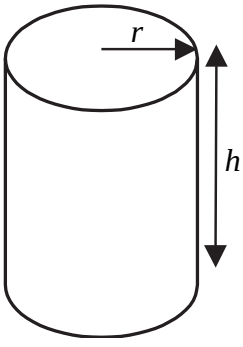


Circumference of circle = $2\pi r$

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

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

Answer ALL TWENTY THREE questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

Leave blank

1. The population of a village was 1750.
The population fell by 12%.
Work out the new population.

D 1.6

.....

(Total 3 marks)

2.

Illustration **NOT** drawn to scale

This rule is used to find how far apart to plant two bushes.

Add the heights of the bushes. Divide your answer by 3.

The heights of two bushes are a cm and b cm.
The two bushes should be planted d cm apart.

Write down a formula for d in terms of a and b.

D 2.3

.....

(Total 3 marks)

Page Total

Turn over

3.

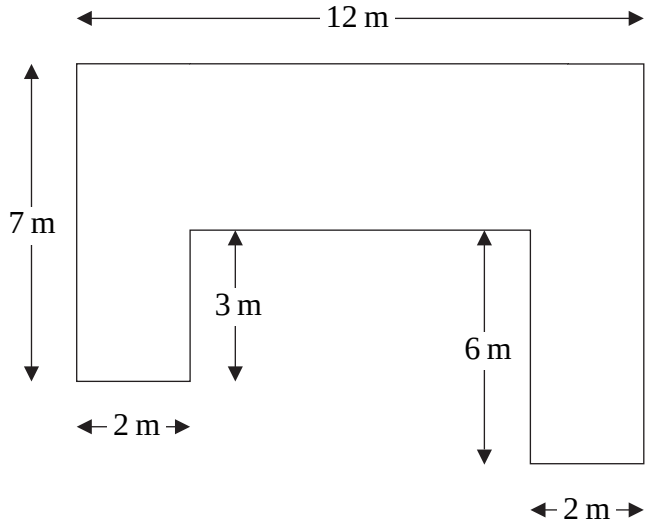


Diagram **NOT** accurately drawn

The diagram shows a paved surface.
All the corners are right angles.
Work out the area of the paved surface.
State the units of your answer.

Leave blank

.....

(Total 4 marks)

D 4.9

4. (a) Work out $\frac{8}{9} \div \frac{2}{3}$
Give your answer as a mixed number.

.....

(2)

D 1.2

(b) Work out $4\frac{1}{2} - 1\frac{3}{5}$
Give your answer as a mixed number.

.....

(3)

B 1.2

(Total 5 marks)

5. (a) Factorise $x^2 + 8x$

Leave blank

D 2.2

.....

(2)

(b) Simplify

(i) $x^3 \times x^5$

.....

(ii) $y^6 \div y^2$

C 2.1

.....

(2)

(c) Make t the subject of the formula $v = u + at$

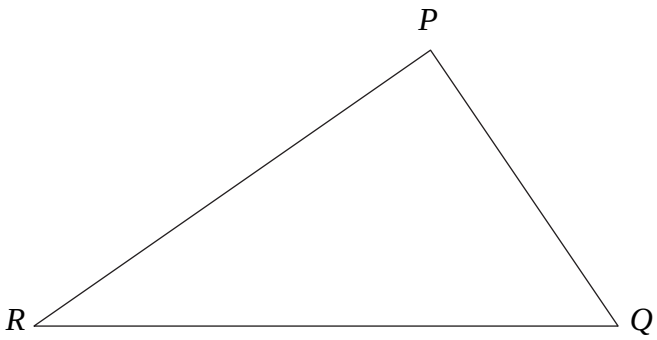
C 2.3

$t =$ .....

(2)

(Total 6 marks)

6.



C 4.5

Use a ruler and compasses to construct the bisector of angle Q.
Show all your construction lines.

(Total 2 marks)

Page Total

Turn over

Leave blank

7. Mortar is made from cement, lime and sand.
The ratio of their weights is 2 : 1 : 9

Work out the weight of cement and the weight of sand in 60 kg of mortar.

cement …… kg

sand …… kg

C 1.7

(Total 3 marks)

---

8. $\mathscr{E}$ = {Integers}
A = {1, 2, 3, 6}
B = {4, 5}
C = {$x : 6 \leq 3x < 18$}

(a) List the elements of the set

(i) $A \cup B$,

.....

(ii) C

.....

C 1.5

(3)

(b) Find $A \cap B$.

.....

C 1.5

(1)

(Total 4 marks)

9.

Leave blank

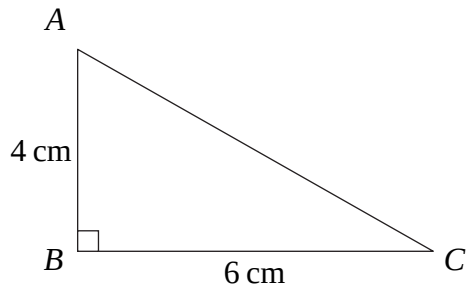


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
AB = 4 cm, *BC* = 6 cm.

(a) Calculate the area of triangle *ABC*.

..... cm^2

(2)

D 4.9

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

..... cm

(3)

C 4.8

(c) Calculate the size of angle *BCA*.
Give your answer correct to 1 decimal place.

°
.....

(3)

C 4.8

(Total 8 marks)

Page Total

Turn over

Leave blank

10. The length of a rod is 98 cm correct to the nearest centimetre.

(a) Write down the minimum length the rod could be.

C 1.8

..... cm
(1)

(b) Work out the maximum total length of 6 of these rods.

B 1.8

..... cm
(2)

(Total 3 marks)

---

11. Solve the equation $x^2 - 6x - 27 = 0$

B 2.7

.....

(Total 3 marks)

---

12. (a) Write down the gradient of the line with equation $y = 3x + 5$

B 3.3

.....
(1)

(b) Find the equation of the line which is parallel to the line with equation $y = 3x + 5$ and passes through the point with coordinates (4,10).

B 3.3

.....
(2)

(Total 3 marks)

13.

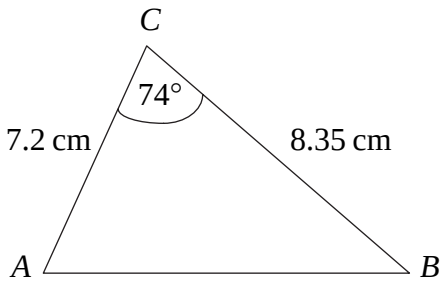


Diagram **NOT** accurately drawn

Leave blank

The diagram shows triangle *ABC*.
AC = 7.2 cm.
BC = 8.35 cm.
Angle *ACB* = 74°.

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

A 4.8

..... cm^2
(2)

(b) Calculate the length of *AB*.
Give your answer correct to 3 significant figures.

A 4.8

..... cm
(3)

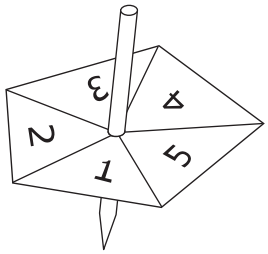
(Total 5 marks)

Page Total

Turn over

14. Here is a 5-sided spinner.

Leave blank



Its sides are labelled 1, 2, 3, 4 and 5.
The spinner is biased.
The probability that the spinner will land on each of the numbers 1 to 4 is given in the table.

Number	1	2	3	4	5
Probability	0.36	0.1	0.25	0.15	

Alan spins the spinner once.

(a) Work out the probability that the spinner will land on 5.

D 6.3

.....
(2)

Bhavana spins the spinner once.

(b) Work out the probability that it will land on 3 or 4.

C 6.3

.....
(2)

Chris spins the spinner 50 times.

(c) Work out an estimate for the number of times the spinner will land on 1.

D 6.3

.....
(2)

Dylan spins the spinner twice.

Leave blank

(d) Work out the probability that

(i) the spinner will land on 2 both times,

.....

A 6.3

(ii) the spinner will land on an even number exactly once.

A* 6.3

.....

(6)

(Total 12 marks)

15.

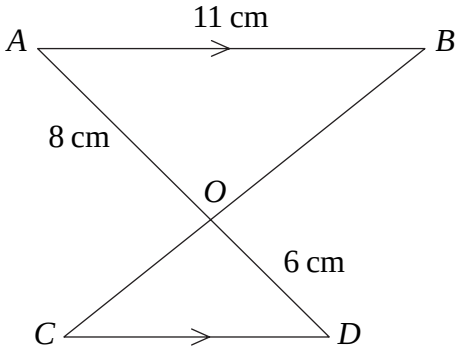


Diagram **NOT** accurately drawn

Calculate the length of *CD*.

CD = ... cm

B 4.10

(Total 3 marks)

Page Total

Turn over

16. The table gives information about the ages, in years, of 100 aeroplanes.

Leave blank

Age (t years)	Frequency
$0 < t \leq 5$	41
$5 < t \leq 10$	26
$10 < t \leq 15$	20
$15 < t \leq 20$	10
$20 < t \leq 25$	3

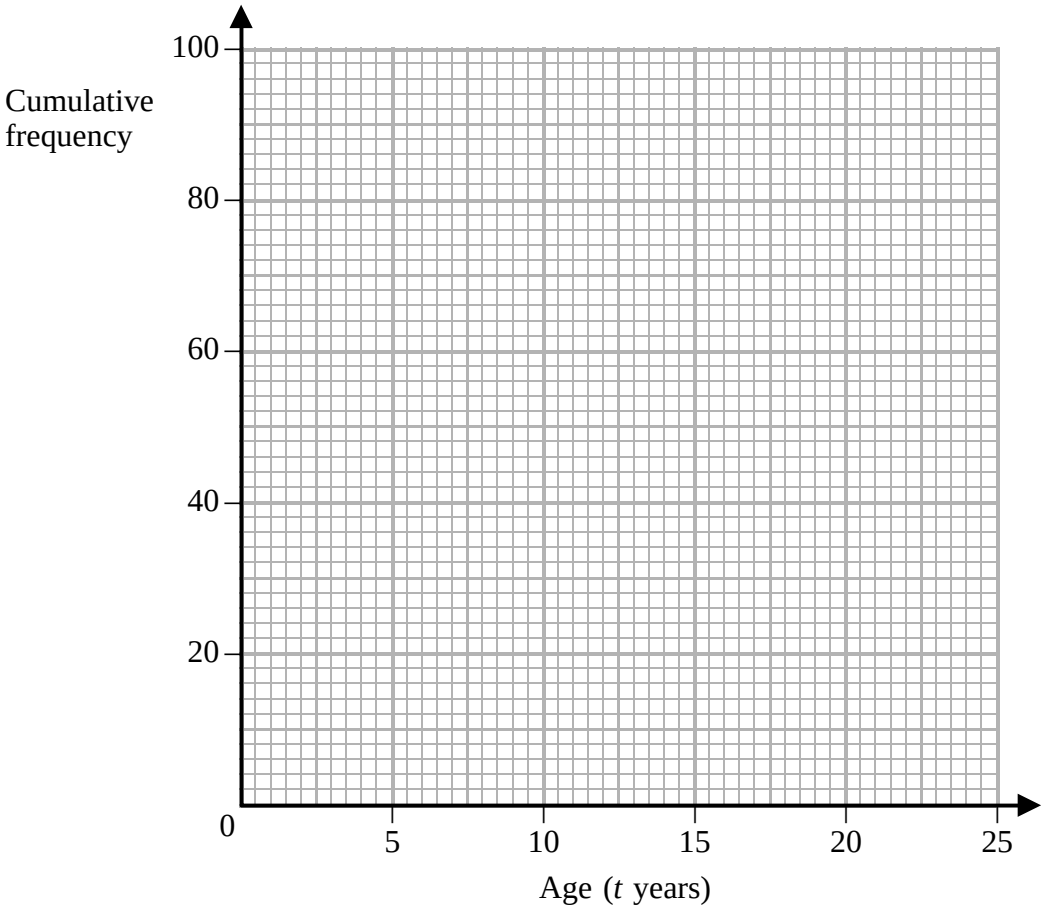
(a) Complete the cumulative frequency table.

Age (t years)	Cumulative frequency
$0 < t \leq 5$	
$0 < t \leq 10$	
$0 < t \leq 15$	
$0 < t \leq 20$	
$0 < t \leq 25$	

B 6.1

(1)

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



B 6.2

(2)

(c) Use your graph to find an estimate for the inter-quartile range of the ages.
Show your method clearly.

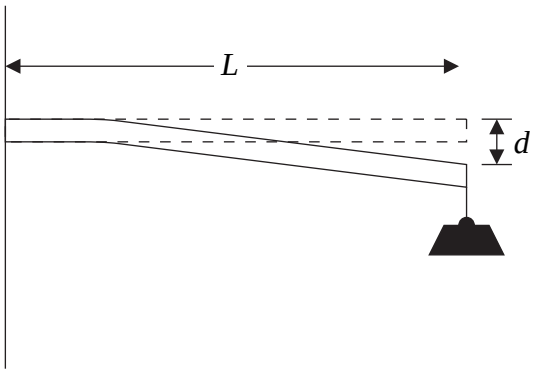
Leave blank

B 6.2

..... years
(2)

(Total 5 marks)

17.



A weight is hung at the end of a beam of length L.
This causes the end of the beam to drop a distance d.
d is directly proportional to the cube of L.
$d = 20$ when $L = 150$

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

$d =$ .....
(3)

A 2.5

(b) Calculate the value of L when $d = 15$

$L =$ .....
(2)

A 2.5

(Total 5 marks)

Page Total

Turn over

18. Convert the recurring decimal $0.2\dot{3}$ to a fraction.
Give your answer in its simplest form.

Leave blank

A 1.3

.....

(Total 3 marks)

---

19. $f(x) = \dfrac{1}{x+2}$

(a) Find the value of x which must be excluded from the domain of $f(x)$.

A 3.2

$x =$ .....

(1)

(b) Find the inverse function $f^{-1}(x)$.

A 3.2

$f^{-1}(x) =$ .....

(2)

(Total 3 marks)

---

20. $p = 3^8$

(a) Express $p^{\frac{1}{2}}$ in the form 3^k, where k is an integer.

A* 1.4

.....

(1)

$q = 2^9 \times 5^{-6}$

(b) Express $q^{-\frac{1}{3}}$ in the form $2^m \times 5^n$, where m and n are integers.

A* 1.4

.....

(2)

(Total 3 marks)

Leave blank

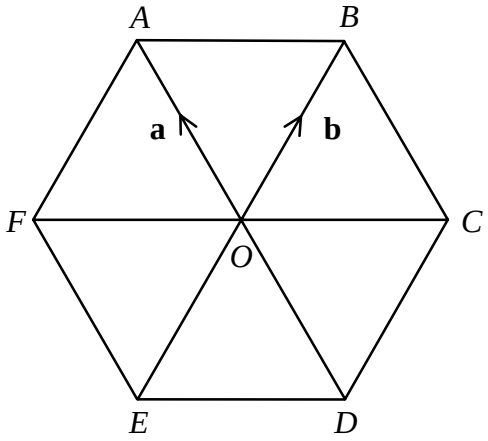
21. Simplify fully $\dfrac{x^2 - 10x + 25}{x^2 - 25}$

A* 2.2

.....

(Total 3 marks)

22.



ABCDEF is a regular hexagon.

$\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OB} = \mathbf{b}$

(a) Write down, in terms of **a** and **b**, the vectors

(i) $\overrightarrow{AB}$

.....

(ii) $\overrightarrow{FC}$

A 5.1

.....

(3)

(b) Write down one geometrical fact about *AB* and *FC* which could be deduced from your answers to part (a).

.....

A* 5.1

.....

(1)

(Total 4 marks)

Page Total

Turn over

23. Solve the simultaneous equations

Leave blank

$$y = 2x - 7$$

$$x^2 + y^2 = 61$$

.....

.....

A* 2.7

(Total 7 marks)

Page Total

TOTAL FOR PAPER: 100 MARKS

END

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

Paper Reference(s)

4400/4H

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Mathematics

Paper 4H

Higher Tier

Specimen Paper

Time: 2 hours

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number and 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 and write the paper reference for which you have been entered.
Answer **ALL** the questions in the spaces provided in this question paper.
Show all the steps in any calculations and state the units.

Information for Candidates

There are 18 pages in this question paper. All blank pages are indicated.
The total mark for this paper is 100. The marks for the various parts of questions are shown in round brackets, e.g. **(2)**.
You may use a calculator.
A formula sheet is printed on the inside cover of this question paper.

Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.
Work steadily through the paper.
Do not spend too long on one question.
Show all stages in any calculations.
If you cannot answer a question, leave it and attempt the next one. Return at the end to those you have left out.

Turn over

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London Examinations
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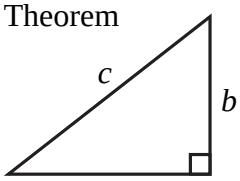
IGCSE MATHEMATICS 4400
FORMULA SHEET – HIGHER TIER

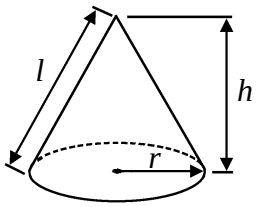
Pythagoras' Theorem



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

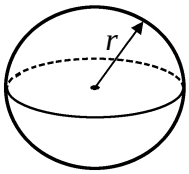
Volume of cone = $\frac{1}{3}\pi r^2 h$

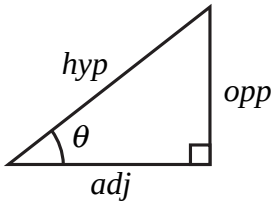
Curved surface area of cone = $\pi r l$



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

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





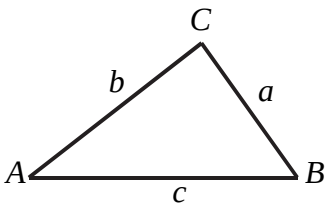
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

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

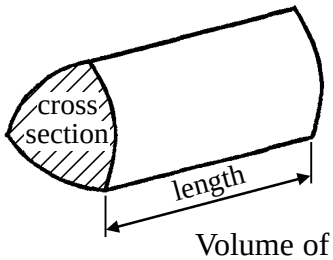
In any triangle *ABC*



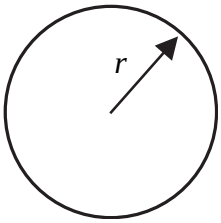
Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



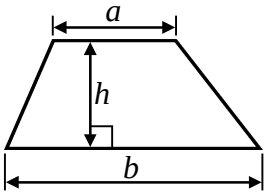
Volume of prism = area of cross section × length

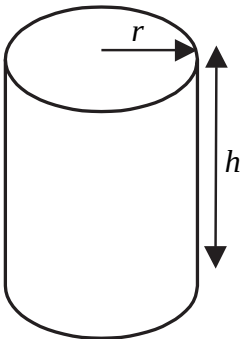


Circumference of circle = $2\pi r$

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 = $2\pi rh$

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

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

Answer ALL TWENTY THREE questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

Leave blank

1. This is a recipe for making a Tuna Bake for **4** people.

> Tuna Bake
>
> Ingredients for **4** people.
>
> 400 g of tuna
> 400 g of mushroom soup
> 100 g of grated cheddar cheese
> 4 spring onions
> 250 g of breadcrumbs

Work out the amounts needed to make a Tuna Bake for **10** people.

…….. g of tuna

…….. g of mushroom soup

…….. g of grated cheddar cheese

…….. spring onions

…….. g of breadcrumbs

D 1.7

(Total 3 marks)

2. (a) Solve $5x - 7 = 2x + 11$

$x =$ .....

(3)

D 2.4

(b) Solve $\frac{16 - y}{3} = 3$

$y =$ .....

(3)

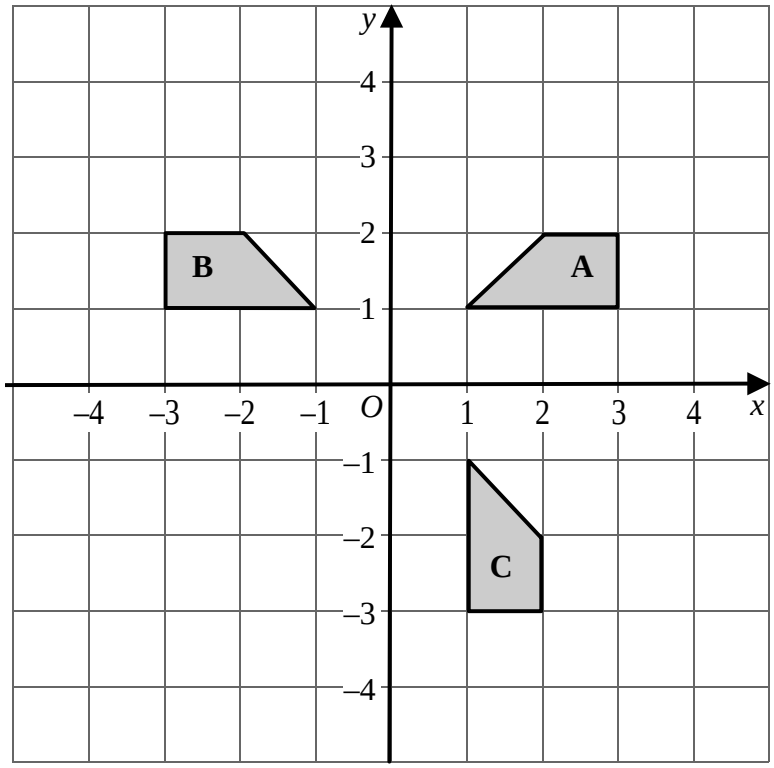
C 2.4

(Total 6 marks)

Page Total

Turn over

3.



(a) Describe fully the single transformation which takes shape **A** onto shape **B**.

.....

(2)

D 5.2

(b) Describe fully the single transformation which takes shape **A** onto shape **C**.

.....

.....

(3)

D 5.2

(Total 5 marks)

---

4. Jo got 36 out of 80 in an English test.

Work out 36 out of 80 as a percentage.

..... %

(Total 2 marks)

D 1.6

Leave blank

Leave blank

5. Work out the value of $\sqrt{\dfrac{83.5\times 978}{1025+222}}$

Give your answer correct to 3 significant figures.

C 1.11

.....

(Total 3 marks)

---

6. (a) Expand

(i) $3(2c + 5)$

.....

(ii) $y(y - 5)$

D 2.2

.....

(2)

(b) Factorise $15m + 10$

D 2.2

.....

(1)

(c) Expand and simplify $(x + 5)(x - 3)$

C 2.2

.....

(2)

(Total 5 marks)

---

7. Express 72 as the product of powers of its prime factors.

C 1.4

.....

(Total 3 marks)

Page Total

Turn over

8. The table gives information about the weights, in kilograms, of 100 donkeys.

Leave blank

Weight of donkeys (w kg)	Frequency
$65 < w \leq 70$	4
$70 < w \leq 75$	10
$75 < w \leq 80$	34
$80 < w \leq 85$	32
$85 < w \leq 90$	16
$90 < w \leq 95$	4

(a) Write down the modal class interval.

D 6.2

..... **(1)**

(b) Work out an estimate for the mean weight of the donkeys.

C 6.2

..... kg **(4)**

(Total 5 marks)

Leave blank

9.

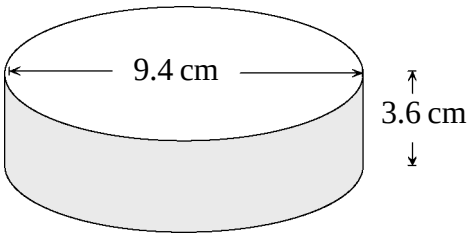


Diagram **NOT** accurately drawn

The diameter of a cylinder is 9.4 cm. Its height is 3.6 cm.

(a) Work out the area of one of the circular ends of the cylinder.
Give your answer correct to 3 significant figures.

D 4.9

..... cm^2
(2)

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

C 4.9

..... cm^3
(2)

(Total 4 marks)

10.

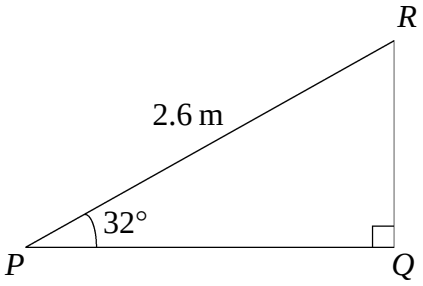


Diagram **NOT** accurately drawn

Angle $Q = 90°$. Angle $P = 32°$. $PR = 2.6$ m.

Calculate the length of QR. Give your answer correct to 3 significant figures.

C 4.8

..... m

(Total 3 marks)

Page Total

Turn over

Leave blank

11. The Andromeda Galaxy is 21 900 000 000 000 000 000 km from the Earth.

(a) Write 21 900 000 000 000 000 000 in standard form.

B 1.9

.....

(1)

Light travels 9.46×10^{12} km in one year.

(b) Calculate the number of years that light takes to travel from the Andromeda Galaxy to the Earth.
Give your answer in standard form correct to 2 significant figures.

B 1.9

.....

(2)

(Total 3 marks)

---

12. Solve the simultaneous equations

$6x + 2y = 21$

$4x + 3y = 19$

B 2.6

$x =$ .....

$y =$ .....

(Total 4 marks)

13. (a) Differentiate with respect to x

Leave blank

$y = x^3 - 3x^2 + 5$

B 3.4

.....

(2)

(b) Hence find the coordinates of the minimum point of the curve

$y = x^3 - 3x^2 + 5$, $x > 0$.

A 3.4

(..... , ...)

(4)

(Total 6 marks)

Page Total

Turn over

14.

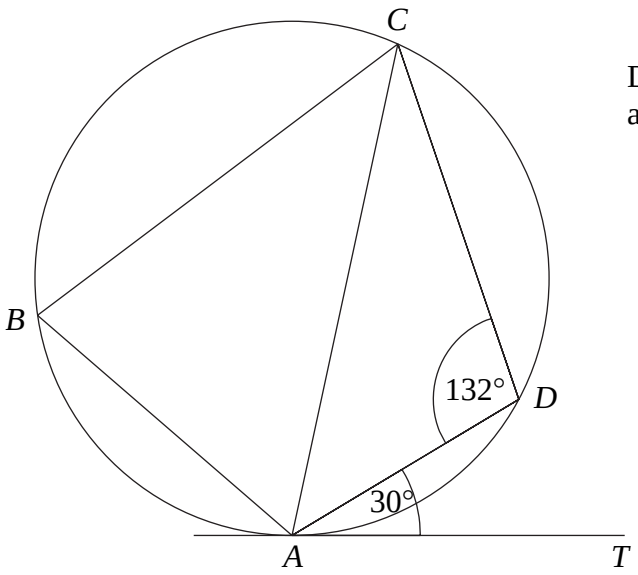


Diagram **NOT** accurately drawn

A, *B*, *C* and *D* are four points on the circumference of a circle.
TA is the tangent to the circle at *A*.
Angle *DAT* = 30°.
Angle *ADC* = 132°.

(a) (i) Calculate the size of angle *ABC*.

.....°

(ii) Give a reason for your answer.

.....

.....

(2)

B 4.6

(b) (i) Calculate the size of angle *CBD*.

.....°

(ii) Give reasons for your answer.

.....

.....

(3)

B 4.6

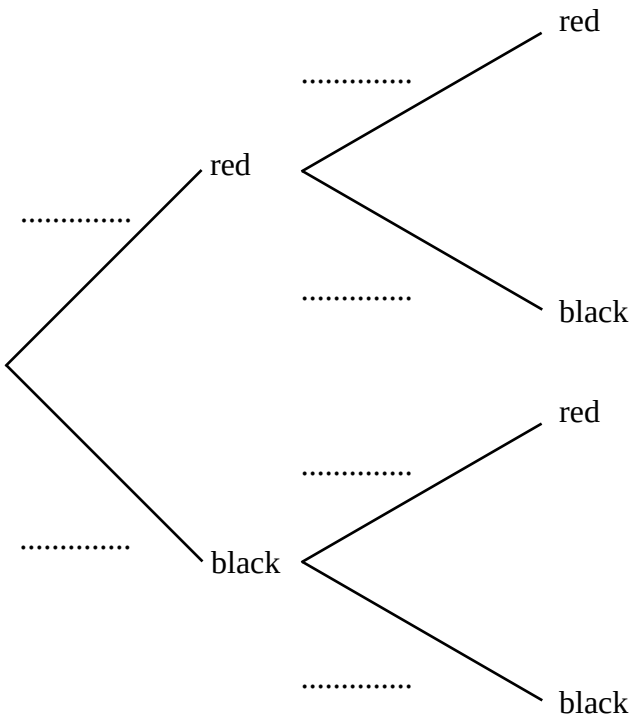
(Total 5 marks)

Leave blank

15. A bag contains 10 coloured discs.
4 of the discs are red and 6 of the discs are black.
Asif is going to take two discs at random from the bag **without** replacement.

Leave blank

(a) Complete the tree diagram.



(2)

B
6.3

(b) Work out the probability that Asif will take two black discs.

.....

(2)

A*
6.3

(c) Work out the probability that Asif will take two discs of different colours.

.....

(3)

A*
6.3

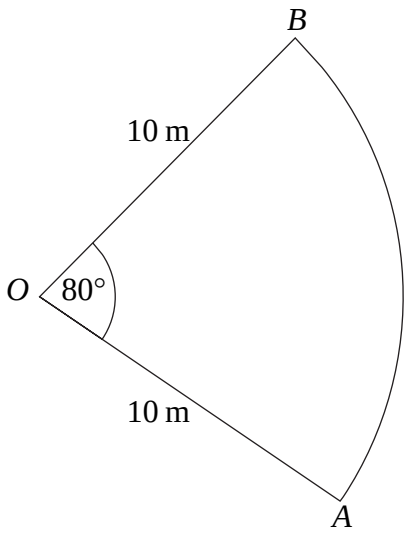
(Total 7 marks)

Page Total

Turn over

Leave blank

16.



The diagram shows the landing area for a throwing competition.
OAB is a sector of a circle, centre *O*, with radius 10 m.
Angle *AOB* = 80°.

Calculate the perimeter of the sector.

A 4.9

..... cm

(Total 3 marks)

---

17. (a) Rationalise $\frac{10}{\sqrt{2}}$

A 1.4

.....

(2)

(b) (i) Express $\sqrt{18}$ in the form $k\sqrt{2}$.

.....

(ii) Express $(4 + \sqrt{18})^2$ in the form $a + b\sqrt{2}$.

A* 1.4

.....

(3)

(Total 5 marks)

18. (a) Complete the table of values for $y = x^3 - 2x^2 - 5x$

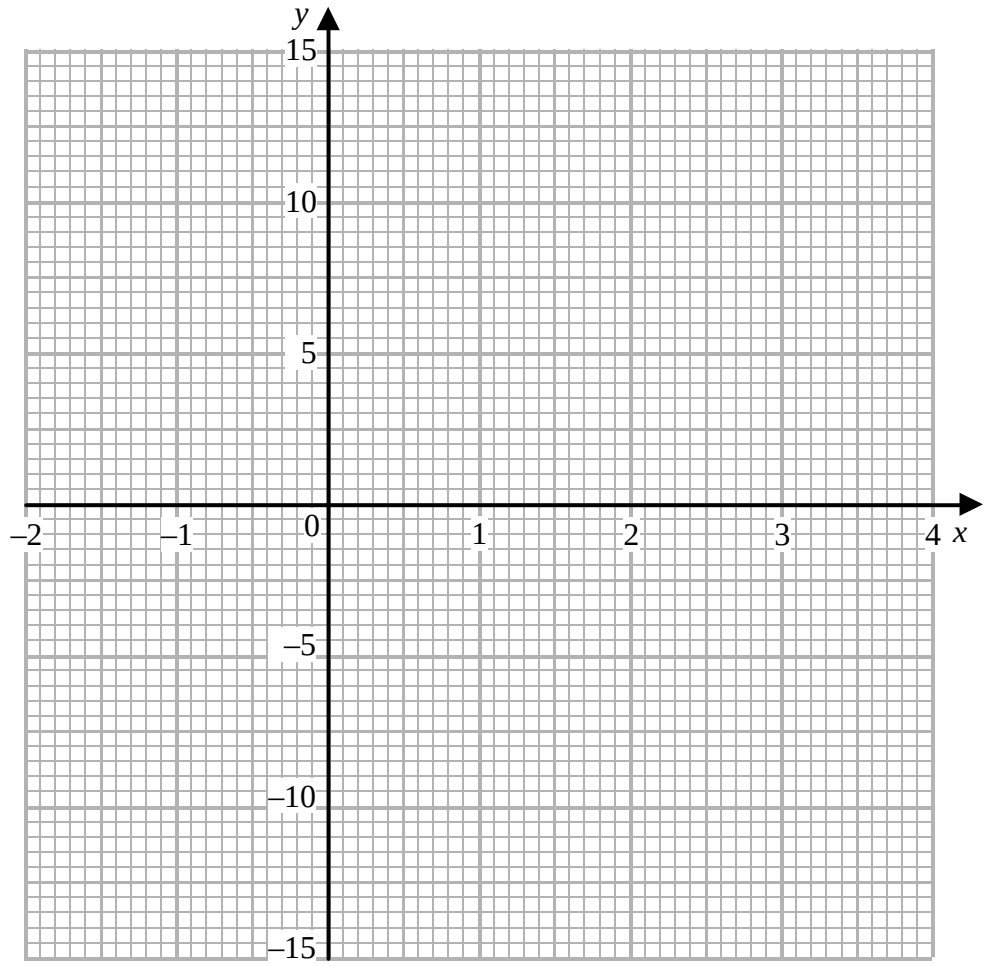
Leave blank

x	–2	–1	0	1	2	3	4
y		2					

B 3.3

(2)

(b) On the grid, draw the graph of $y = x^3 - 2x^2 - 5x$



B 3.3

(2)

The x coordinates of the points of intersection of the curve and a certain straight line give the solutions to the equation $x^3 - 2x^2 - 6x + 1 = 0$

(c) Find the equation of the straight line.

.....

A 3.3

(2)

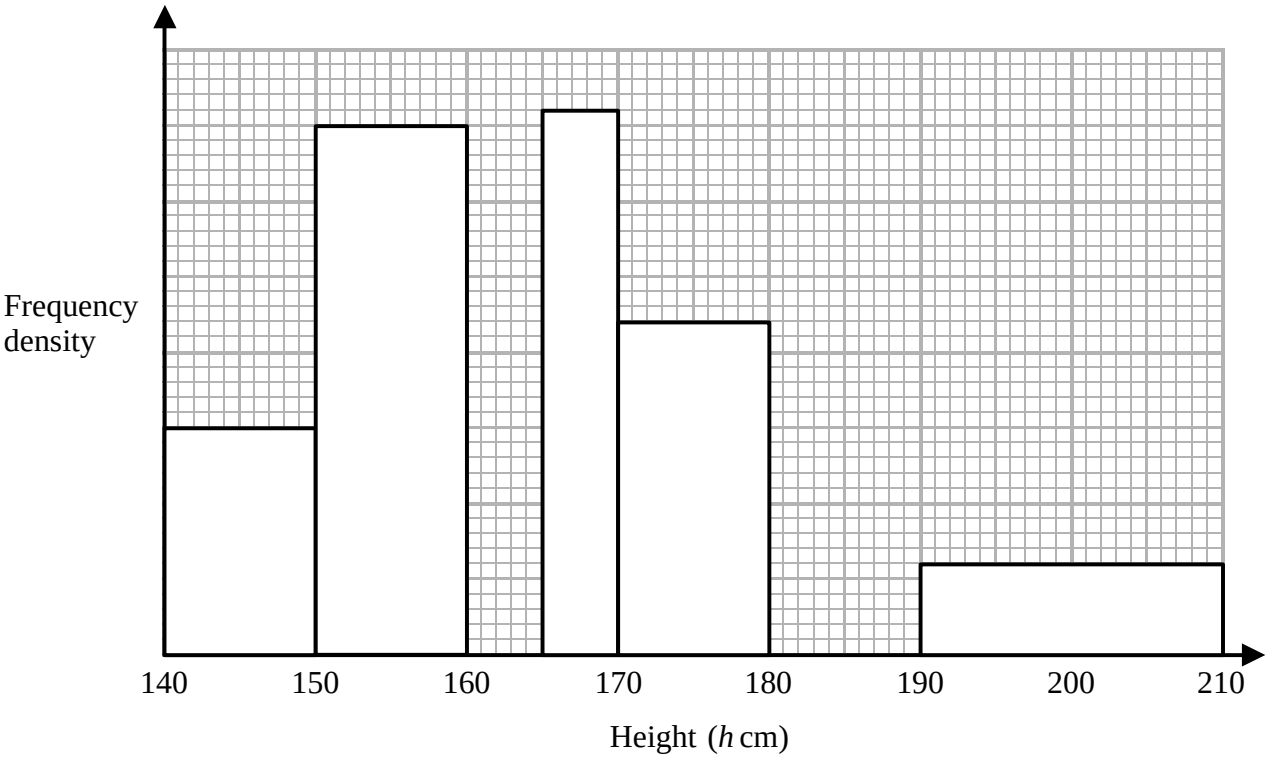
(Total 6 marks)

Page Total

Turn over

19. The unfinished histogram and table give information about the heights, in centimetres, of the Year 11 students at Mathstown High School.

Leave blank



Height (h cm)	Frequency
$140 \leq h < 150$	15
$150 \leq h < 160$	
$160 \leq h < 165$	20
$165 \leq h < 170$	
$170 \leq h < 180$	
$180 \leq h < 190$	12
$190 \leq h < 210$	

(a) Use the histogram to complete the table.

(3)

(b) Use the table to complete the histogram.

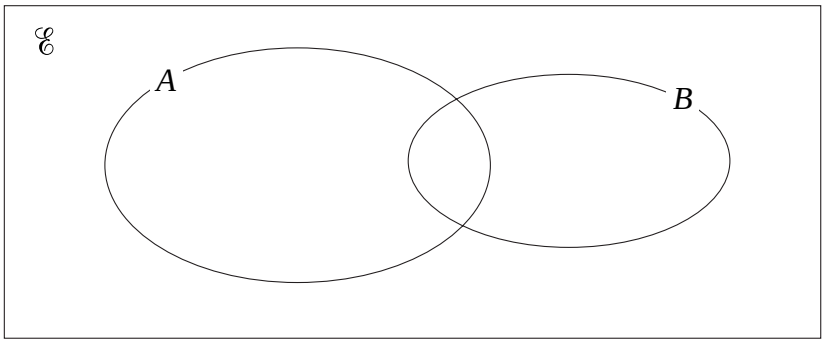
(3)

(Total 6 marks)

A 6.1

20.

Leave blank



$n(\mathscr{E}) = 32$, $n(A') = 20$ and $n(A \cap B') = 8$.

Find

(i) $n(A)$,

.....

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

A 1.5

.....

(Total 3 marks)

21. Show that the equation

$$\frac{2}{(x+1)} - \frac{1}{(x+2)} = \frac{1}{2}$$

can be written in the form

$$x^2 - x - 4 = 0$$

A* 2.2

(Total 4 marks)

Page Total

Turn over

22.

Leave blank

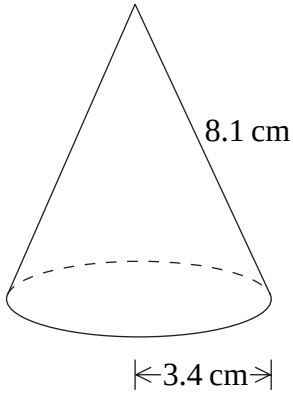


Diagram **NOT** accurately drawn

The radius of the base of a cone is 3.4 cm and its slant height is 8.1 cm.

(a) Calculate the total surface area of the cone.
Give your answer correct to 3 significant figures.

A* 4.9

..... cm^2
(3)

A larger, mathematically similar cone has a volume 64 times the volume of the above cone.

(b) Calculate the radius of the base of the larger cone.

A* 4.10

..... cm
(2)

(Total 5 marks)

23. Make y the subject of the formula $x = \sqrt{\frac{y-a}{y-b}}$

Leave blank

$y =$ .....

A* 2.3

(Total 4 marks)

Page Total

TOTAL FOR PAPER: 100 MARKS

END

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London Examinations

IGCSE

IGCSE Mathematics (4400)

Mark Schemes for Specimen Papers with Specification Grid

Paper 1F (Foundation Tier)

Paper 1F – Specification Grid

Qu.	Specification Ref	Number	Algebra	Shape, space & measures	Handling data	Grade G	Grade F	Grade E	Grade D	Grade C	Common to Paper 3H
1	1.1, 1.4	4				3		1			
2	3.1		3			1	2				
3	1.1	5				3	2				
4	4.6			2		2					
5	6.1, 6.2				6	4	2				
6	4.2, 5.2			4		2	2				
7	2.3		5			2	3				
8	1.4, 1.9	6					3	3			
9	6.3				6		2		4		(b)(c) → Q13
10	4.4			3			3				
11	2.2		4					2	2		(b) → Q5
12	1.2	6					2	2	2		(c) → Q4
13	4.9			2				2			
14	4.5			5				3		2	(b) → Q6
15	2.3, 2.4		8			2		3	3		(c) → Q2
16	6.3				6			4		2	
17	1.6	3							3		Q1
18	4.4			3				1	2		
19	4.9			4					4		Q3
20	1.10, 4.4	3								3	
21	4.8			3						3	Q9
22	1.7	3								3	Q7
23	1.8	2								2	(a) → Q10
24	1.5	4								4	Q8
Total		36	20	26	18	19	21	21	20	19	

Paper 1F – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
1	(a)	1.1	G		10, 15	1	B1	
	(b)	1.1	G		8, 12	1	B1	
	(c)	1.4	G		16	1	B1	
	(d)	1.1	E		11 or 13	1	B1	
2	(a)	3.1	G		26, 30	1	B1	
	(b)	3.1	F		eg Add 4, $4n + 2$	1	B1	
	(c)	3.1	F	eg All terms in the sequence are even. 675 is odd		1	B1	
3	(a)	1.1	G		Moscow	1	B1	
	(b)	1.1	G		–21, –7, –6, 0, 13, 23	2	B2	B1 for all except one in correct order
	(c)	1.1	F		29	1	B1	
	(d)	1.1	F		1	1	B1	
4	(i)	4.6	G		radius	2	B1	
	(ii)	4.6	G		chord		B1	
5	(a)	6.1	G		6	1	B1	
	(b)	6.1	G		11	1	B1	
	(c)	6.1	G		June	1	B1	
	(d)	6.1	G		Bars correct	1	B1	
	(e)	6.2	F	(b) × 30		2	M1	
					330		A1	ft from (b)

Paper 1F – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
6	(a)	4.2	G		B, E, H	2	B2	B1 for 2 and not more than 1%
	(b)(i)	5.2	F		F or I	2	B1	for either F or I or both
	(ii)	5.2	F		2		B1	(dep on first B1)
7	(a)	2.3	G	$2 \times 12 + 2 \times 7$ or 24 & 14 seen		2	M1	
					38		A1	
	(b)	2.3	F	$2 \times 16 + 2W = 50$		3	M1	
				$2W = 18$			M1	
					9		A1	
8	(a)(i)	1.4	F		44.89	2	B1	
	(ii)	1.9	E		40		B1	
	(b)	1.4	F		8.7	1	B1	
	(c)	1.4	F		1728	1	B1	
	(d)	1.4	E	10 seen		2	M1	
					1058		A1	
9	(a)	6.3	F	(1,H) (2,H) (3,H) (4,H) (5,H) (1,T) (2,T) (3,T) (4,T) (5,T)		2	B2	B2 for all 10 (condone omission of (3,H)) B1 for 6 correct
	(b)	6.3	D	$1 - (0.36+0.1+0.25+0.15)$		2	M1	
					0.14		A1	
	(c)	6.3	D	0.36×50		2	M1	
					18		A1	

Paper 1F – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes
10	(a)	4.4	F		1.5 – 2	1	B1
	(b)	4.4	F	(a) × (3 – 4)		2	M1
					4.5 – 8		A1
11	(a)	2.2	E		$7b - 4c$	2	B2 B1 for $7b$ B1 for –4c
	(b)	2.2	D		$x(x + 8)$	2	B2 B1 for $x(\ldots)$ or $x + 8$ seen
12	(a)	1.2	F	÷ by 5 & × by 4		2	M1
					68		A1
	(b)	1.2	E	$\frac{8}{9} - \frac{6}{9}$		2	M1
					$\frac{2}{9}$		A1
	(c)	1.2	D	$\frac{8}{9} \times \frac{3}{2}$		2	M1
					$1\frac{1}{3}$		A1
13		4.9	E	eg 56 ÷ (4 × 2)		2	M1
					7		A1
14	(a)	4.5	E	*RQ* 7.7cm $\pm$ 0.2cm & *PR* 6.4cm $\pm$ 0.2cm		3	B1
					$\angle R$ 35° $\pm$ 2°		B1
					correct Δ		B1 within guidelines
	(b)	4.5	C	construction arcs		2	M1
					$\angle$ bisector		A1 within guidelines

Paper 1F – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes
15	(a)	2.3	G	(46 + 20) ÷ 3	22	2	M1 A1
	(b)	2.4	E	3×50 or (90+x)÷3=50 150−90 or 90+x=150	60	3	M1 M1 A1
	(c)	2.3	D		$d = \frac{a+b}{3}$	3	B1 for LHS d = … B2 for $\frac{a+b}{3}$ B1 for $a + b \div 3$, $a+\frac{b}{3}$
16	(a)(i)	6.3	E		$\frac{9}{18}$ or $\frac{1}{2}$	2	B1
	(ii)	6.3	E		$\frac{4}{18}$ or $\frac{2}{9}$		B1
	(b)	6.3	C	(a)(i) + (a)(ii)	$\frac{13}{18}$	2	M1 A1 ft from (a)
	(c)	6.3	E	$\frac{8}{15}$ seen	probability has increased	2	M1 A1
17		1.6	D	$\frac{12}{100}\times 1780$ or 210 1750 – “210”	1540	3	M1 M1 dep on first M1 A1

Paper 1F – Mark Scheme

No	Spec	Grade	Working	Answer	Mark	Notes
18	4.4	E	line on bearing 137±2°		3	M1
		D	line on bearing 213±2°			M1
		D	× marked within guidelines			A1
19	4.9	D	eg 7×2 + 4×8 + 10×2		4	M1 for splitting up area
			14 + 32 + 20			A1 2 correct products
				66		A1
				m^2		B1
20	1.10/ 4.4	C	2.4 seen		3	B1
			136 ÷ 2.4 or 136 ÷ 2.24			M1
				55		A1
21	4.8	C	4^2+6^2 or 52 seen		3	M1
			$\sqrt{36+16}$			M1 dep on first M1
				7.21		A1 Accept 3 sf or better
22	1.7	C	60 ÷ 12 or 5 seen		3	M1
				10		A1
				45		A1
23 (a)	1.8	C		97.5	2	B1 Accept 98.499 or better
(b)	1.8	C		98.5		B1
24 (a)(i)	1.5	C		1,2,3,4,5,6	3	B1
(ii)	1.5	C		2,3,4,5		B2 B1 for 2,3,4,5,6
(b)	1.5	C		ϕ	1	B1

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IGCSE

IGCSE Mathematics (4400)

Mark Schemes for Specimen Papers with Specification Grid

Paper 2F (Foundation Tier)

Paper 2F – Specification Grid

Qu.	Specification Ref	Number	Algebra	Shape, space & measures	Handling data	Grade G	Grade F	Grade E	Grade D	Grade C	Common to Paper 4H
1	1.2, 1.6	4				4					
2	1.3	4				2	2				
3	3.3, 4.1, 4.3, 4.4		2	5		6	1				
4	3.1		5			2	3				
5	6.2				7	3	4				
6	4.2, 4.3			3		1	2				
7	4.4			2		2					
8	1.6	4					2		2		(b) → Q4
9	3.3		3				3				
10	4.9			2			2				
11	1.10	4						4			
12	3.3		5					5			
13	6.1				4			4			
14	4.1			4				4			
15	1.3	3						3			
16	1.7	3							3		Q1
17	2.4		6						3	3	Q2
18	5.2			5					5		Q3
19	1.11	3								3	Q5
20	2.2		5						3	2	Q6
21	1.4	3								3	Q7
22	6.2				7				1	6	Q8
23	4.9			4					2	2	Q9
24	4.8			3						3	Q10
Total		28	26	28	18	20	19	20	19	22	

Paper 2F – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
1	(a)	1.2	G		$\frac{6}{10}$ or $\frac{3}{5}$	1	B1	
	(b)	1.6	G		60	1	B1	
	(c)	1.2	G		$\frac{3}{4}$ and $\frac{7}{8}$	2	B2	B1 for 1✓ and 0 ✗
2	(a)	1.3	G	5.08, 5.3, 7.21, 7.35, 7.8		2	B2	B1 for all except one in correct order
	(b)	1.3	F	$\frac{35}{100}$		2	M1	for $\frac{35}{100}$
					$\frac{7}{20}$		A1	for $\frac{7}{20}$ cao
3	(a)(i)	3.3	G		(7,1)	2	B1	
	(ii)	3.3	G		(0,3)		B1	
	(b)	4.1	G		isosceles	1	B1	
	(c)	4.4	G		71-75	1	B1	
	(d)(i)	4.4	F		30-34	2	B1	
	(ii)	4.1	G		acute		B1	
	(e)	4.3	G		line of symmetry	1	B1	
4	(a)	3.1	G		drawing	1	B1	
	(b)	3.1	G		17, 20	1	B1	
	(c)	3.1	F		8	1	B1	
	(d)	3.1	F	eg $5 + 9 \times 3$		2	M1	
					32		A1	
5	(a)	6.2	G		8	1	B1	
	(b)	6.2	G	1,4,4,5,6,8,8,8,9, 10		2	M1	for putting in order
					7		A1	
	(c)	6.2	F		9	1	B1	
	(d)	6.2	F	8+6+4+8+1+10+8 +4+9+5 or 63		3	M1	
				63÷10			M1	dep on first M1
					6.3		A1	
6	(a)	4.2	G		parallelogram	1	B1	
	(b)	4.3	F		0	1	B1	
	(c)	4.3	F		2	1	B1	
7	(a)	4.4	G		4.5	1	B1	Accept 4.4-4.6
	(b)	4.4	G		3.8	1	B1	Accept 3.7-3.9
8	(a)	1.6	F	$\frac{65}{100} \times 40$		2	M1	
					26		A1	
	(b)	1.6	D	$\frac{36}{80}$ or 0.45		2	M1	
					45		A1	
9	(i)	3.3	E		18	3	B1	
	(ii)	3.3	E		8.5		B1	
	(iii)	3.3	E		5.8		B1	
10	(i)	4.9	F		5	2	B1	
	(ii)	4.9	F		9		B1	
11	(a)	1.10	E	800×1.545		2	M1	
					1236		A1	
	(b)	1.10	E	$120 \div 1.545$ or 77.66(99…)		2	M1	
					77.67		A1	

Paper 2F – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
12	(a)	3.3	E		–7, –4, 2, 5	2	B2	B1 for at least two ✓
	(b)	3.3	E		pts plotted line drawn	2	B1 B1	
	(c)	3.3	E		1.4 – 1.6	1	B1	ft from line
13		6.1	E	360° ÷ 40 oe	U (126°) F (81°) S (108°) G (45°)	4	B1 B2 B1	for 360°÷ 40 oe seen for 4 sectors within guidelines (B1 for 2 sectors within guidelines) (dep on 2 of previous 3 marks) for correct labelling
14	(a)(i)	4.1	E		65	2	B1	
	(ii)			180° in a ! and base ∠ s of an isosceles < are equal			B1	
	(b)(i)	4.1	E		30°	2	B1	ft from "65°"
				exterior ∠ = sum of interior ∠ s at the other two vertices			B1	Accept ∠ s on a st line and ∠ sum of !
15		1.3	E	$\frac{1}{4}$, 0.299, 30%, $\frac{1}{3}$, 0.37, $\frac{2}{5}$ oe		3	M1 A2	for clear attempt to express all numbers in the same format correct order (A1 for 2 correct conversions)
16		1.7	D		1000, 1000 250, 10, 625	3	B3	B2 for three correct B1 for one correct
17	(a)	2.4	D	$5y-2y=11+7$ $3y=18$	 6	3	M1 M1 A1	
	(b)	2.4	C	$16-q=3\times3$ $-q=$"9"–16 or $q=16-$"9"	 7	3	M1 M1 A1	
18	(a)	5.2	D		Reflection *y*-axis	2	M1 A1	
	(b)	5.2	D		Rotation 90° clockwise about *O*	3	M1 A1 A1	or –90°
19		1.11	C		8.09	3	B3	B2 for 65.48… or better seen B1 for 81663 or 1247 or 65.5 seen
20	(a)(i)	2.2	D		$6c + 15$	2	B1	
	(ii)	2.2	D		y^2-10y		B1	
	(b)	2.2	D		$5(3m+2)$	1	B1	
	(c)	2.2	C	$x^2-3x+5x-15$	 $x^2+2x-15$	2	M1 A1	
21		1.4	C		$2^3\times3^2$	3	B3	B2 for 2×2×2×3×3 B1 for correct prime factors

Paper 2F – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
22	(a)	6.2	D		$75 < w \leq 80$	1	B1	
	(b)	6.2	C	50½th or 50th		2	M1	
					$80 < w \leq 85$		A1	
	(c)	6.2	C	67.5×4 + 72.5×10 + 77.5×34 + 82.5×32 + 87.5×16 + 92.5×4		4	M2	M1 if consistent values other than mid-interval values used
				270+725+2635+2640 +1400+370 or 8040				
				"8040" ÷ 100			M1	dep on at least M1
					80.4		A1	
23	(a)	4.9	D	$\pi \times 4.7^2$		2	M1	
					69.397…		A1	for 69.4 or better
	(b)	4.9	C	"69.4" × 3.6		2	M1	
					249.832…		A1	for 250 or better
24		4.8	C	2.6 sin 32°		3	M2	
					1.3777…		A1	for 1.38 or better

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IGCSE

IGCSE Mathematics (4400)

Mark Schemes for Specimen Papers with Specification Grid

Paper 3H (Higher Tier)

Paper 3H – Specification Grid

Qu.	Specification Ref	Number	Algebra	Shape, space & measures	Handling data	Grade D	Grade C	Grade B	Grade A	Grade A*	Common to Paper 1F
1	1.6	3				3					Q17
2	2.3		3			3					Q15
3	4.9			4		4					Q19
4	1.2	5				2		3			(a) → Q12
5	2.1,2.2,2.3		6			2	4				(a) → Q11
6	4.5			2			2				Q14
7	1.7	3					3				Q22
8	1.5	4					4				Q24
9	4.8, 4.9			8		2	6				(b) → Q21
10	1.8	3					1	2			(a) → Q23
11	2.7		3					3			
12	3.3		3					3			
13	4.8			5					5		
14	6.3				12	4	2		2	4	(a)(c) → Q9
15	4.10			3				3			
16	6.1, 6.2				5			5			
17	2.5		5						5		
18	1.3	3							3		
19	3.2		3						3		
20	1.4	3								3	
21	2.2		3							3	
22	5.1			4					3	1	
23	2.7		7							7	
Total		24	33	26	17	20	22	19	21	18	

Paper 3H – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
1		1.6	D	$\frac{12}{100}\times 1750$ or 210 1750 – "210"	 1540	3	M1 M1 A1	 dep on first M1
2		2.3	D		$d=\frac{a+b}{3}$	3	B1 B2	for LHS d = … for $\frac{a+b}{3}$ B1 for $a+b\div 3$, $a+\frac{b}{3}$
3		4.9	D	eg $7\times 2+4\times 8+10\times 2$ 14 + 32 + 20	 66 m^2	4	M1 A1 A1 B1	for splitting up area 2 correct products
4	(a)	1.2	D	$\frac{8}{9}\times\frac{3}{2}$	 $1\frac{1}{3}$	2	M1 A1	
	(b)	1.2	B	eg $\frac{9}{2}-\frac{8}{5}$ $\frac{45}{10}-\frac{16}{10}$	 $2\frac{9}{10}$	3	M1 M1 A1	
5	(a)	2.2	D		$x(x+8)$	2	B2	B1 for x(…) or $x+8$ seen
	(b)(i)	2.1	C		x^8	2	B1	
	(ii)	2.1	C		y^4		B1	
	(c)	2.3	C	$at=v-u$	 $\frac{v-u}{t}$	2	M1 A1	
6		4.5	C	construction arcs	 $\angle$ bisector	2	M1 A1	 within guidelines
7		1.7	C	60 ÷ 12 or 5 seen	 10 45	3	M1 A1 A1	
8	(a)(i)	1.5	C		1,2,3,4,5,6	3	B1	
	(ii)	1.5	C		2,3,4,5		B2	B1 for 2,3,4,5,6
	(b)	1.5	C		–	1	B1	
9	(a)	4.9	D	$\frac{1}{2}\times 6\times 4$	 12	2	M1 A1	
	(b)	4.8	C	4^2+6^2 or 52 seen $\sqrt{36+16}$	 7.21	3	M1 M1 A1	 dep on first M1 Accept 3 sf or better
	(c)	4.8	C	$\tan C=\frac{4}{6}$	 33.7	3	M2 A1	 for 33.7 or better
10	(a)	1.8	C		97.5	1	B1	
	(b)	1.8	B	98.5×6	 591	2	M1 A1	 Accept 590.99 or better

Paper 3H – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
11		2.7	B	$(x - 9)(x + 3) = 0$	9 -3	3	M1 A1 A1	
12	(a)	3.3	B		3	1	B1	
	(b)	3.3	B		$y = 3x - 2$	2	B2	B1 for $y = 3x + c$ where $c \neq 5$
13	(a)	4.8	A	$\frac{1}{2} \times 7.2 \times 8.35 \sin 74°$	28.9	2	M1 A1	28.9 or better
	(b)	4.8	A	$7.2^2 + 8.35^2$ $-2 \times 7.2 \times 8.35 \cos 74°$ $51.84 + 69.7225$ $- 33.1426\ldots$	9.40	3	M1 M1 A1	or 88.419 seen 9.40 or better
14	(a)	6.3	D	$1 - (0.36 + 0.1 + 0.25 + 0.15)$	0.14	2	M1 A1	
	(b)	6.3	C	$0.25 + 0.15$	0.4	2	M1 A1	
	(c)	6.3	D	0.36×50	18	2	M1 A1	
	(d)(i)	6.3	A	0.1×0.1	0.01	6	M1 A1	
	(ii)	6.3	A*	0.25 & 0.75 seen 0.25×0.75 or 0.1875 $\times 2$ oe	0.375		B1 M1 M1 A1	
15		4.10	B	$\frac{CD}{11} = \frac{6}{8}$ $CD = 11 \times \frac{6}{8}$	8.25	3	M1 M1 A1	
16	(a)	6.1	B		41,67,87,97,100	1	B1	
	(b)	6.2	B		Points correct Curve or lines	2	B1 B1	ft
	(c)	6.2	B	25 (or 25¼) & 75 (or 75¾) indicated	≈ 11.5 (curve) ≈ 12 (lines)	2	M1 A1	ft from graph if B1 or B2 in (c)
17	(a)	2.5	A	$d = kL^3$ $20 = k \times 150^3$	$d = 0.0000059L^3$	3	M1 M1 A1	$k \neq 1$ Accept 2 or more sf
	(b)	2.5	A	$L^3 = \frac{15}{"k"}$	136	2	M1 A1	Accept 135.57-136.5
18		1.3	A	$10x = 2.\dot{3}$ $9x = 2.1$	$\frac{7}{30}$	3	M1 M1 A1	

Paper 3H – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
19	(a)	3.2	A		-2	1	B1	
	(b)	3.2	A	eg clear attempt to make x the subject of $y = \frac{1}{x+2}$	$\frac{1}{x} - 2$	2	M1 A1	or flow diagram method $+2 \rightarrow$ divide into 1 $-2 \leftarrow$ divide into 1
20	(a)	1.4	A*		3^4	1	B1	
	(b)	1.4	A*		2^{-3} 5^2	2	B1 B1	
21		2.2	A*	$\frac{(x-5)^2}{(x+5)(x-5)}$	$\frac{(x-5)}{(x+5)}$	3	M1 M1 A1	for $(x-5)^2$ for $(x+5)(x-5)$
22	(a)(i)	5.1	A		$\mathbf{b} - \mathbf{a}$	3	B1	
	(ii)	5.1	A	$2 \times$ (i)	$2(\mathbf{b} - \mathbf{a})$		M1 A1	
	(b)	5.1	A*		$AB \parallel FC$ or $CF = 2AB$		B1	must have correct (a)
23		2.7	A*	$x^2 + (2x-7)^2 = 61$ $x^2 + 4x^2 - 28x + 49 = 61$ $5x^2 - 28x - 12 = 0$ $(5x+2)(x-6) = 0$ $x = -\frac{2}{5}$ $x = 6$ $x = 6, y = 5$	$x = -\frac{2}{5}, y = 7\frac{4}{5}$ or	7	M1 M1 M1 M1 A1 A1 A1	 for both

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IGCSE

IGCSE Mathematics (4400)

Mark Schemes for Specimen Papers with Specification Grid

Paper 4H (Higher Tier)

Paper 4H – Specification Grid

Qu.	Specification Ref	Number	Algebra	Shape, space & measures	Handling data	Grade D	Grade C	Grade B	Grade A	Grade A*	Common to Paper 2F
1	1.7	3				3					Q16
2	2.4		6			3	3				Q17
3	5.2			5		5					Q18
4	1.6	2				2					Q8
5	1.11	3					3				Q19
6	2.2		5			3	2				Q20
7	1.4	3					3				Q21
8	6.2				5	1	4				Q22
9	4.9			4		2	2				Q23
10	4.8			3			3				Q24
11	1.9	3						3			
12	2.6		4					4			
13	3.4		6					2	4		
14	4.6			5				5			
15	6.3				7			2		5	
16	4.9			3					3		
17	1.4	5							2	3	
18	3.3		6					4	2		
19	6.1				6				6		
20	1.5	3							3		
21	2.2		4							4	
22	4.9, 4.10			5						5	
23	2.3		4							4	
Total		22	35	25	18	19	20	20	20	21	

Paper 4H – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
1		1.7	D		1000, 1000 250, 10, 625	3	B3	B2 for three correct B1 for one correct
2	(a)	2.4	D	$5y-2y=11+7$ $3y=18$	 6	3	M1 M1 A1	
	(b)	2.4	C	$16-q=3\times3$ $-q=$"9"-16 or $q=16-$"9"	 7	3	M1 M1 A1	
3	(a)	5.2	D		Reflection *y*-axis	2	M1 A1	
	(b)	5.2	D		Rotation 90° clockwise about *O*	3	M1 A1 A1	or –90°
4		1.6	D	$\frac{36}{80}$ or 0.45	 45	2	M1 A1	
5		1.11	C		8.09	3	B3	B2 for 65.48… or better seen B1 for 81663 or 1247 or 65.5 seen
6	(a)(i)	2.2	D		$6c + 15$	2	B1	
	(ii)	2.2	D		y^2-10y		B1	
	(b)	2.2	D		$5(3m+2)$	1	B1	
	(c)	2.2	C	$x^2-3x+5x-15$	 $x^2+2x-15$	2	M1 A1	
7		1.4	C		$2^3\times3^2$	3	B3	B2 for $2\times2\times2\times3\times3$ B1 for correct prime factors
8	(a)	6.2	D		$75 < w \leq 80$	1	B1	
	(b)	6.2	C	67.5×4 + 72.5×10 + 77.5×34 + 82.5×32 + 87.5×16 + 92.5×4 270+725+2635+2640 +1400+370 or 8040 "8040" ÷ 100	 80.4	4	M2 M1 A1	M1 if consistent values other than mid-interval values used dep on at least M1
9	(a)	4.9	D	$\pi\times4.7^2$	 69.397…	2	M1 A1	 for 69.4 or better
	(b)	4.9	C	"69.4" × 3.6	 249.832…	2	M1 A1	 for 250 or better
10		4.8	C	2.6 sin 32°	 1.3777…	3	M2 A1	 for 1.38 or better
11	(a)	1.9	B		2.19×10^{19}	1	B1	
	(b)	1.9	B	$\frac{"2.19\times10^{19}"}{9.46\times10^{12}}$	 2.3×10^6	2	M1 A1	 for 2.3×10^6 or better

Paper 4H – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
12		2.6	B	eg $18x+6y=63$ $8x+6y=38$		4	M1	multiplication of both equations by appropriate numbers
				$10x=25$			A1	addition or subtraction to obtain one correct solution
					$x=2.5$			
				eg $4\times2.5+3y=19$			M1	(dep) substitution for x or y
					$y=3$		A1	for second correct solution
13	(a)	3.4	B		$\frac{dy}{dx}=3x^2-6x$	2	B2	B1 for $3x^2$ B1 for $-6x$
	(b)	3.4	A	"$3x^2-6x$"$=0$		4	M1	
				$3x(x-2)=0$			M1	
				$x=0$ or $x=2$			A1	
					(2, 1)		A1	
14	(a)(i)	4.6	B		48	2	B1	
	(ii)			opposite ∠s of a cyclic quadrilateral			B1	
	(b)(i)	4.6	B		18	3	B1	
	(ii)			$\angle ABD$ or $\angle ACD = 30°$ (alternate segment theorem)			B1	
				eg $\angle CBD$ = "48" – $\angle ABD$ (∠ sum of triangle & ∠s in the same segment)			B1	
15	(a)	6.3	B		$\frac{4}{10}$, $\frac{6}{10}$ oe on LH branches	2	B1	
					$\frac{3}{9}$, $\frac{6}{9}$, $\frac{4}{9}$, $\frac{5}{9}$ oe on RH branches		B1	
	(b)	6.3	A*	$\frac{6}{10}\times\frac{5}{9}$		2	M1	
					$\frac{30}{90}$ oe		A1	
	(c)	6.3	A*	$\frac{4}{10}\times\frac{6}{9}$ or $\frac{6}{10}\times\frac{4}{9}$		3	M1	
				sum of both products			M1	
					$\frac{48}{90}$		A1	
16		4.9	A	$\frac{80}{360}\times\pi\times20$ or 13.96 …		3	M1	
				+ 20			M1	
					33.96…		A1	for 34.0 or better
17	(a)	1.4	A	$\frac{10\sqrt{2}}{\sqrt{2}\times\sqrt{2}}$		2	M1	
					$5\sqrt{2}$		A1	
	(b)(i)	1.4	A*		$3\sqrt{2}$	3	B1	
	(ii)	1.4	A*	$16+8\sqrt{18}+18$			M1	
					$34+24\sqrt{2}$		A1	

Paper 4H – Mark Scheme

No		Spec	Grade	Working	Answer	Mark	Notes	
18	(a)	3.3	B	–6, (2),0,–6,–10,–6,–12		2	B2	B1 for 3 correct
	(b)	3.3	B		Points correct Curve	2	B1 B1	
	(c)	3.3	A	$x^3 - 2x^2 - 5x = x - 1$	$y = x - 1$	2	M1 A1	
19	(a)	6.1	A		35, 18, 22, 12	3	B3	B2 for 3 correct B1 for 2 correct
	(b)	6.1	A		40 12	3	B2 B1	
20	(i)	1.5	A	8 correctly placed	 12	3	M1 A1	
	(ii)	1.5	A		4		A1	
21		2.2	A*	$\frac{2(x+2)-(x+1)}{(x+1)(x+2)} = \frac{1}{2}$ $\frac{x+3}{(x+1)(x+2)} = \frac{1}{2}$ $2(x+3) = (x+1)(x+2)$ $2x+6 = x^2+3x+2$		4	M1 M1 M1 A1	
22	(a)	4.9	A*	$\pi \times 3.4^2$ or 36.316… $+\pi \times 3.4 \times 8.1$ or 86.519…	 122.83…	3	M1 M1 A1	or M2 for $\pi \times 3.4 \times (3.4+8.1)$ for 123 or better
	(b)	4.10	A*	$\sqrt[3]{64} = 4$	13.6	2	M1 A1	
23		2.3	A*	$x^2 = \frac{y-a}{y-b}$ $x^2 y - y = bx^2 - a$ $y(x^2-1) = bx^2 - a$	$\frac{bx^2 - a}{x^2 - 1}$	4	M1 M1 M1 A1	

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Telephone: +44 (0) 1623 450 781
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For more information on Edexcel International, please contact our
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Registered Office: 190 High Holborn, London WC1V 7BH, UK