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

Paper Reference(s)

Examiner's use only

Team Leader's use only

Edexcel GCSE

Mathematics

Paper 4 (Calculator)

Higher Tier

Specimen paper

Time: 1 hour 45 minutes

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.
If you need more space to complete your answer to any question, use additional answer sheets.
You must NOT write on the formulae page. Anything you write on the formulae page will gain NO credit.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 26 questions in this question paper. The total mark for this paper is 100.
There are 20 pages in this question paper. Any blank pages are indicated.
Calculators may be used.
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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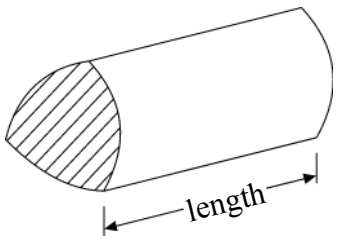
GCSE Mathematics

Formulae: Higher Tier

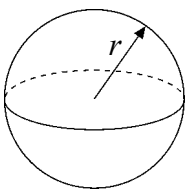
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of a prism = area of cross section × length



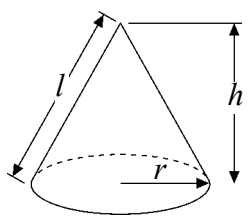
Volume of sphere $= \frac{4}{3}\pi r^3$

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

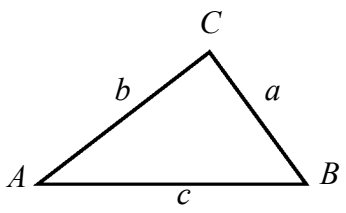


Volume of cone $= \frac{1}{3}\pi r^2 h$

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



In any triangle ABC



The Quadratic Equation

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

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

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 $= \frac{1}{2}ab\sin C$

Leave blank

Answer ALL TWENTY SIX questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1. (a) Work out the value of

$$\frac{15.6}{3.3 \times 1.6}$$

Write down all the figures on your calculator display.

.....

(2)

(b) Round your answer to part (a) correct to 3 significant figures.

.....

(1)

Q1

(Total 3 marks)

2. Sally thinks of a number.

She adds 11 to the number.
She then multiplies by 3

Her answer is 60

What number did Sally first think of?

.....

Q2

(Total 2 marks)

Leave blank

3.

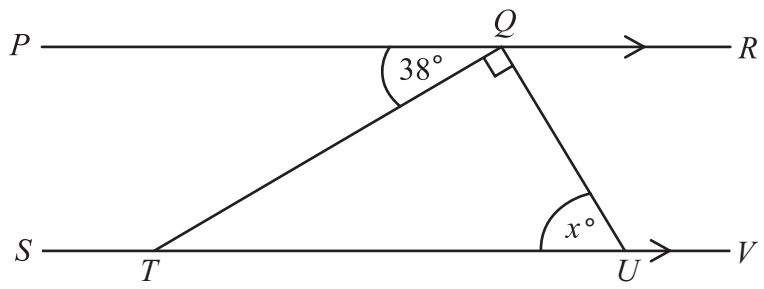


Diagram **NOT** accurately drawn

PQR and *STUV* are parallel straight lines.

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

.....
°

(ii) Give reasons for your answer.

.....

.....

Q3

(Total 3 marks)

4. Imran plays a game of chess with his friend.
A game of chess can be won or drawn or lost.

The probability that Imran wins the game of chess is 0.3
The probability that Imran draws the game of chess is 0.25

Work out the probability that Imran loses the game of chess.

.....

Q4

(Total 2 marks)

Leave blank

5. The manager at "Wheels R Us" recorded the time in minutes it took to change the wheels on cars using his garage.

Here are his results.

25	34	12	8	6	21	18	14	16	22
21	15	16	32	9	15	18	21	12	8

(i) Draw a stem and leaf diagram to show these results.

Key: 1 | 4 = 14

(ii) Find the median time.

Q5

(Total 4 marks)

6. Michael buys 3 cartons of milk.
The total cost of 3 cartons of milk is £4.20

Work out the total cost of 7 cartons of milk.

£ .....

Q6

(Total 3 marks)

Leave blank

7. Andy sells CDs.
He sells each CD for £8.80 plus VAT at 17 $\frac{1}{2}$ %.

He sells 650 CDs.

Work out how much money Andy gets.

£.....

(Total 4 marks)

Q7

8. Change $3.25\,m^3$ to cm^3.

..... cm^3

(Total 2 marks)

Q8

9. Solve $4(y+3)=6$

y = ...

(Total 3 marks)

Q9

Leave blank

10. The probability that Asif will pass his driving test at the first attempt is 0.6

(a) Explain why Asif is more likely to pass the test at the first attempt than he is to fail at the first attempt.

.....

.....

(1)

A driving test centre is designing a questionnaire.

This question has been designed to find out how many hours of driving lessons have been taken by someone who is about to take a test.

"How long have you spent on driving lessons?"

(b) Design a better question for the driving centre to use.
You should include some response boxes.

(2) **Q10**

(Total 3 marks)

Leave blank

11.

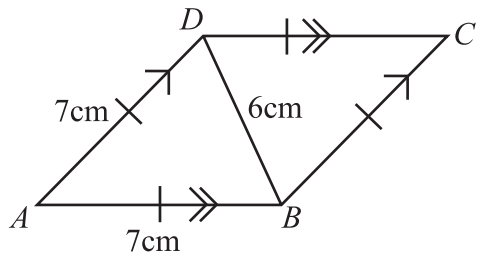


Diagram **NOT** accurately drawn

ABCD is a rhombus of side 7 cm.
The length of the diagonal *BD* is 6 cm.

Use ruler and compasses to **construct** the rhombus *ABCD*.
The side *AB* has been drawn for you.
You must show **all** construction lines.

A *B*

Q11

(Total 4 marks)

Leave blank

12. A train travels at a speed of 180 kilometres per hour.
Graham said that 180 kilometres per hour is the same as 50 metres per second.

Show working to show that Graham was correct.

Q12

(Total 3 marks)

13. The equation

$$x^3 + 10x = 51$$

has a solution between 2 and 3
Use a trial and improvement method to find this solution.
Give your answer correct to 1 decimal place.
You must show **all** your working.

Q13

x = ...

(Total 4 marks)

Leave blank

14. Three boys shared £48 in the ratio 5:4:3

Daniel received the smallest amount.

(a) Work out the amount Daniel received.

£ .....

(3)

A year ago, Daniel's height was 1.24 metres.
Daniel's height has now increased by 9.5%.

(b) Work out Daniel's height now.
Give your answer to an appropriate degree of accuracy.

..... m

(4)

Q14

(Total 7 marks)

Leave blank

15.

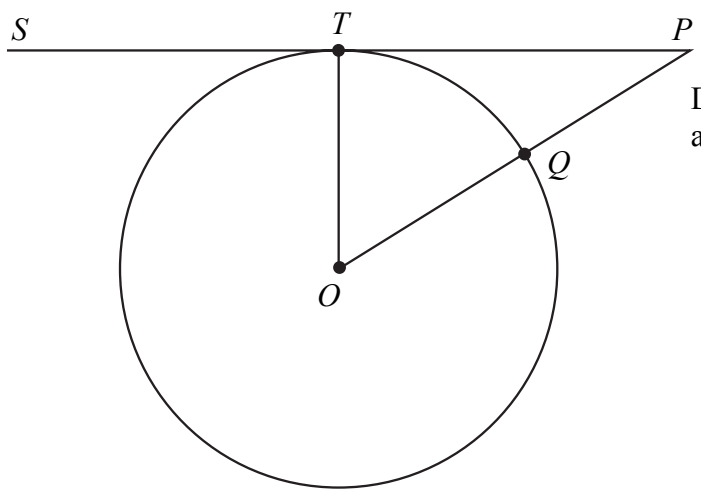


Diagram **NOT** accurately drawn

STP is a tangent to the circle, centre *O*.
Q is a point on the circumference of the circle.
OQP is a straight line.

OP = 26 cm and *TP* = 24 cm.

(a) Angle *OTP* = 90°
Give a reason why.

.....

(1)

(b) Work out the radius *OQ* of the circle.

..... cm

(4)

(c) Work out the area of the circle.
Give your answer correct to 3 significant figures.

..... cm^2

(2)

(Total 7 marks)

Q15

Leave blank

16. The table shows information about the number of hours that 120 children watched television last week.

Number of hours (h)	**Frequency**
$0 < h \leqslant 2$	10
$2 < h \leqslant 4$	20
$4 < h \leqslant 6$	25
$6 < h \leqslant 8$	40
$8 < h \leqslant 10$	15
$10 < h \leqslant 12$	10

(a) Work out an estimate for the mean number of hours that the children watched television last week.

..... hours

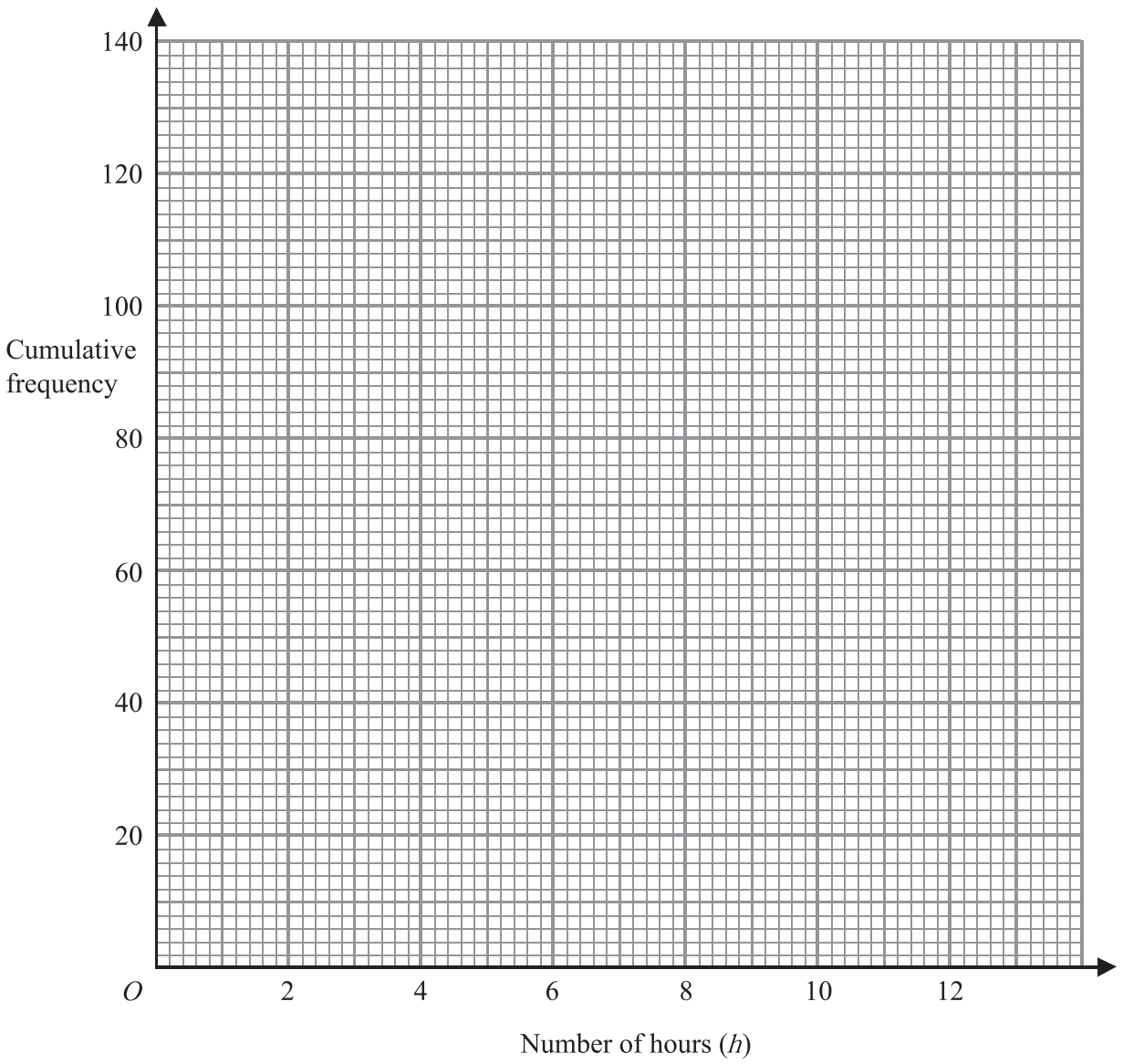
(4)

(b) Complete the cumulative frequency table.

Number of hours (h)	**Cumulative frequency**
$0 < h \leqslant 2$	10
$0 < h \leqslant 4$	
$0 < h \leqslant 6$	
$0 < h \leqslant 8$	
$0 < h \leqslant 10$	
$0 < h \leqslant 12$	

(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 number of children who watched television for **fewer** than 5 hours last week.

.....

(2)

Q16

(Total 9 marks)

Leave blank

17. Town *B* is 4.5 km due West of town *C*.
Town *A* is 2.4 km due North of town *B*.

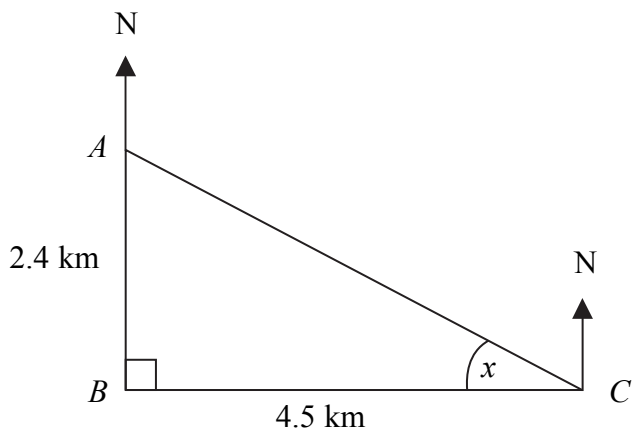


Diagram **NOT** accurately drawn

(a) Calculate the size of the angle marked *x*.
Give your answer correct to 3 significant figures.

x = ... °

(3)

(b) Find the bearing of town *C* from town *A*.
Give your answer correct to 3 significant figures.

..... °

(1)

(Total 4 marks)

Q17

Leave blank

18. (a) Simplify $a^4 \times a^5$

.....

(1)

(b) Simplify $4xy^3 \times 3x^2y$

.....

(2)

(c) Factorise $p^2 - 16q^2$

.....

(2)

Q18

(Total 5 marks)

19. Solve

$$3x - 2y = 3$$
$$x + 4y = 8$$

$x =$ .....

$y =$ .....

Q19

(Total 3 marks)

Leave blank

20. Make t the subject of the formula

$$D = 5t + \pi t + 5w$$

$t =$ .....

(Total 3 marks)

Q20

21.

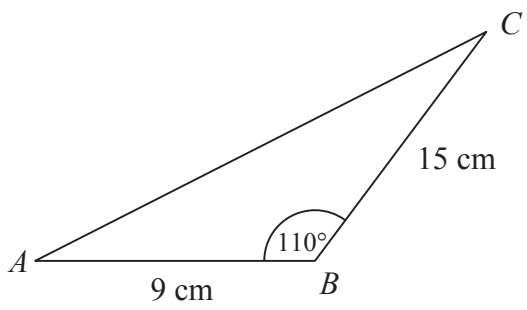


Diagram **NOT** accurately drawn

ABC is a triangle.
AB = 9 cm
BC = 15 cm
Angle ABC = 110°

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

..... cm^2

(Total 3 marks)

Q21

Leave blank

22. Two boxes contain coloured bricks.
Box A contains 2 red bricks, 3 blue bricks and 1 yellow brick.
Box B contains 3 red bricks, 2 yellow bricks and 1 green brick.

Janet selects one brick from box A and one brick from box B.

Calculate the probability that the two bricks will be of the same colour.

.....

(Total 3 marks)

Q22

Leave blank

23. A painting was valued at £600 on 1 January 2004.
The value of the painting is predicted to increase at a rate of R% per annum.

The predicted value, £V, of the painting after n years is given by the formula

$$V = 600 \times (1.055)^n$$

Use your calculator to find the predicted value of the painting after 15 years.

£.....

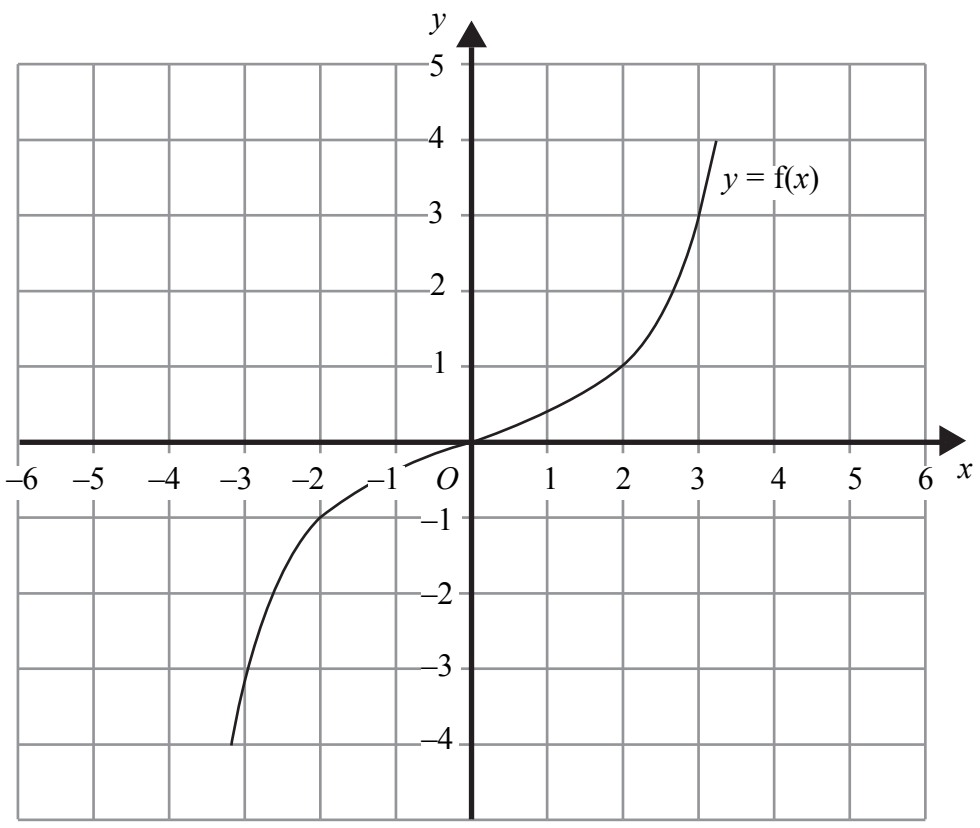
Q23

(Total 3 marks)

Leave blank

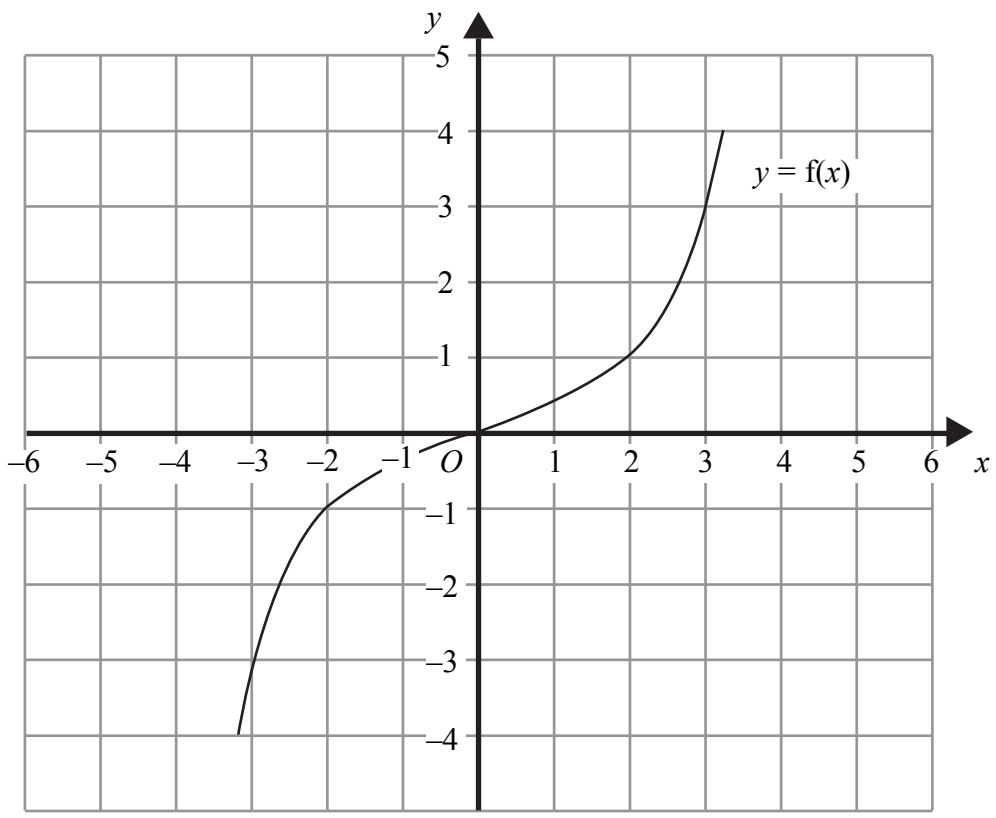
24. The graph of $y = f(x)$ is shown on the grids.

(a) On this grid, sketch the graph of $y = f(x + 3)$



(2)

(b) On this grid, sketch the graph of $y = - f(x)+1$



(2)

(Total 4 marks)

Q24

Leave blank

25. The time period T of a simple pendulum, of length l, is given by the formula

$T = 2\pi\sqrt{\frac{l}{g}}$,where g is the acceleration due to gravity.

The length of a simple pendulum is given as 30 cm correct to 2 significant figures.
The value of g is given as 9.8 correct to 2 significant figures.

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

.....

(Total 4 marks)

Q25

26. Simplify fully

(a) $(2x^3y)^5$

.....

(2)

(b) $\frac{x^2 - 4x}{x^2 - 6x + 8}$

.....

(3)

Q26

(Total 5 marks)

TOTAL FOR PAPER: 100 MARKS

END