Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						5	5	2	5	/	0	5	Signature	

Paper Reference(s)

5525/05

Examiner's use only

Team Leader's use only

Edexcel GCSE

Mathematics A – 1387

Paper 5 (Non-Calculator)

Higher Tier

Tuesday 6 November 2007 – Morning

Time: 2 hours

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
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.
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 24 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.
Calculators must not be used.

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.

Printer's Log. No.
N29108A
W850/R5525/57570 6/6/6/3/

N 2 9 1 0 8 A 0 1 2 4

Turn over

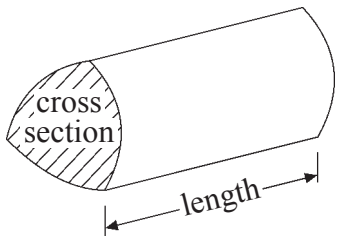
edexcel
advancing learning, changing lives

GCSE Mathematics 1387/8

Formulae: Higher Tier

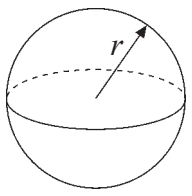
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of a prism = area of cross section × length



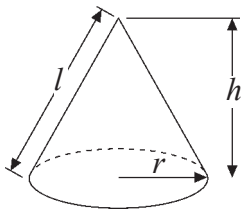
Volume of sphere $= \frac{4}{3}\pi r^3$

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

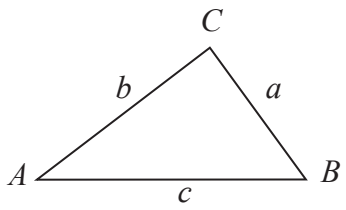


Volume of cone $= \frac{1}{3}\pi r^2 h$

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



In any triangle ABC



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

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 FOUR questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1. (a) Work out $2\frac{3}{4}+3\frac{2}{3}$

Give your answer as a fraction in its simplest form.

.....

(3)

(b) (i) Which of these fractions can be written as a recurring decimal?

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{5}$

.....

(ii) Explain your answer.

.....

.....

.....

(2) **Q1**

(Total 5 marks)

Leave blank

2. The cost of hiring a car can be worked out using this rule.

Cost = £90 + 50p per mile

The cost of hiring a car and driving m miles is C pounds.

(a) Complete the formula for C in terms of m.

C = ...

(2)

Zara hired a car.

The cost is £240

(b) How many miles did Zara drive?

..... miles

(3)

(Total 5 marks)

Q2

Leave blank

3. (a) Work out the Highest Common Factor (HCF) of 24 and 64

.....

(2)

(b) Work out the Lowest Common Multiple (LCM) of 24 and 64

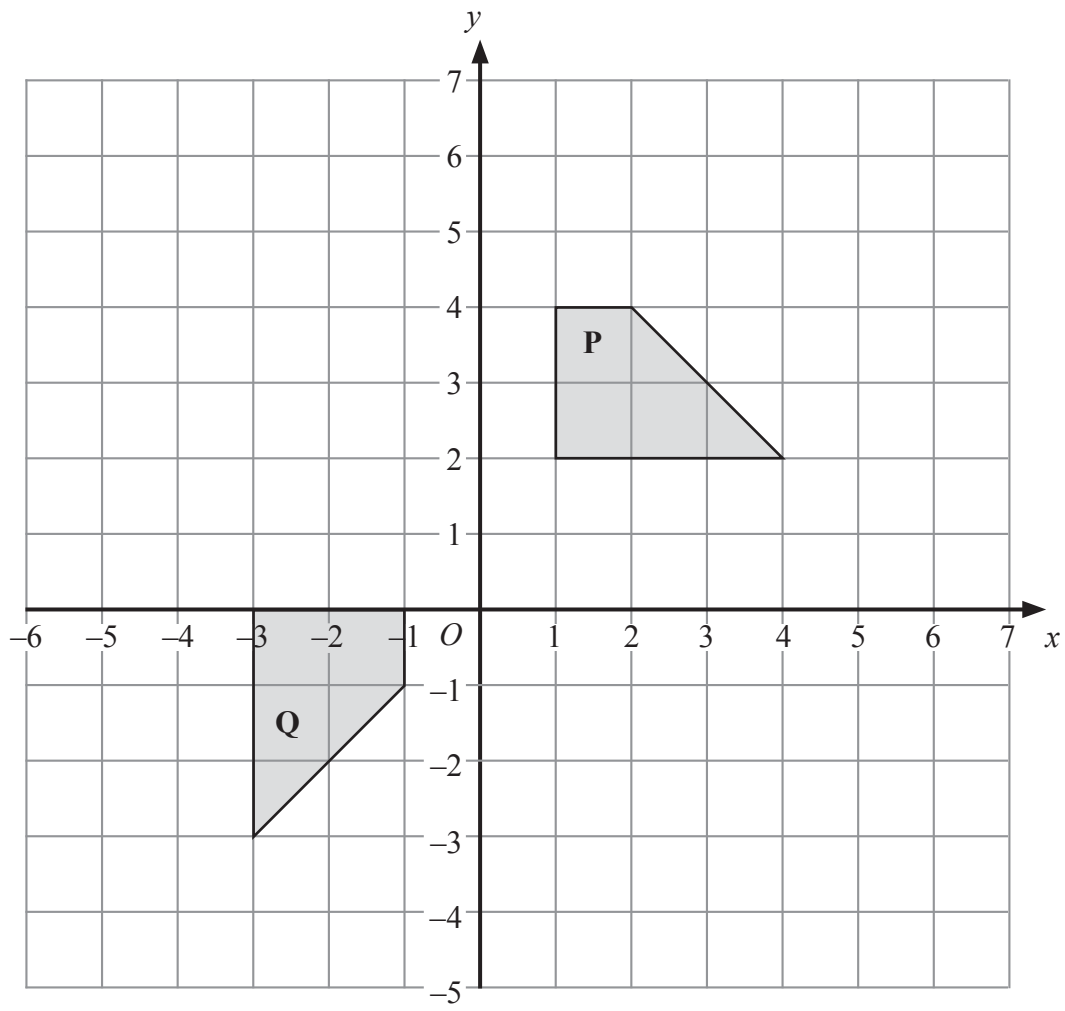
.....

(2) **Q3**

(Total 4 marks)

Leave blank

4.



Describe fully the single transformation that will map shape **P** onto shape **Q**.

.....

.....

(Total 3 marks)

Q4

5. Lillian, Max and Nazia share a sum of money in the ratio 2 : 3 : 5

Nazia receives £60

Work out how much money Lillian receives.

£ .....

(Total 3 marks)

Q5

Leave blank

6. Here are the first four terms of a number sequence.

2 7 12 17

(a) Work out the 10th term of this number sequence.

.....

(2)

Here are the first five terms of another number sequence.

– 4 – 1 2 5 8

(b) (i) Find, in terms of n, an expression for the nth term of this number sequence.

.....

(ii) Find **two** numbers that are in both number sequences.

.....

(3) **Q6**

(Total 5 marks)

7. Use ruler and compasses to **construct** an angle of 30° at P.
You **must** show all your construction lines.

P _____

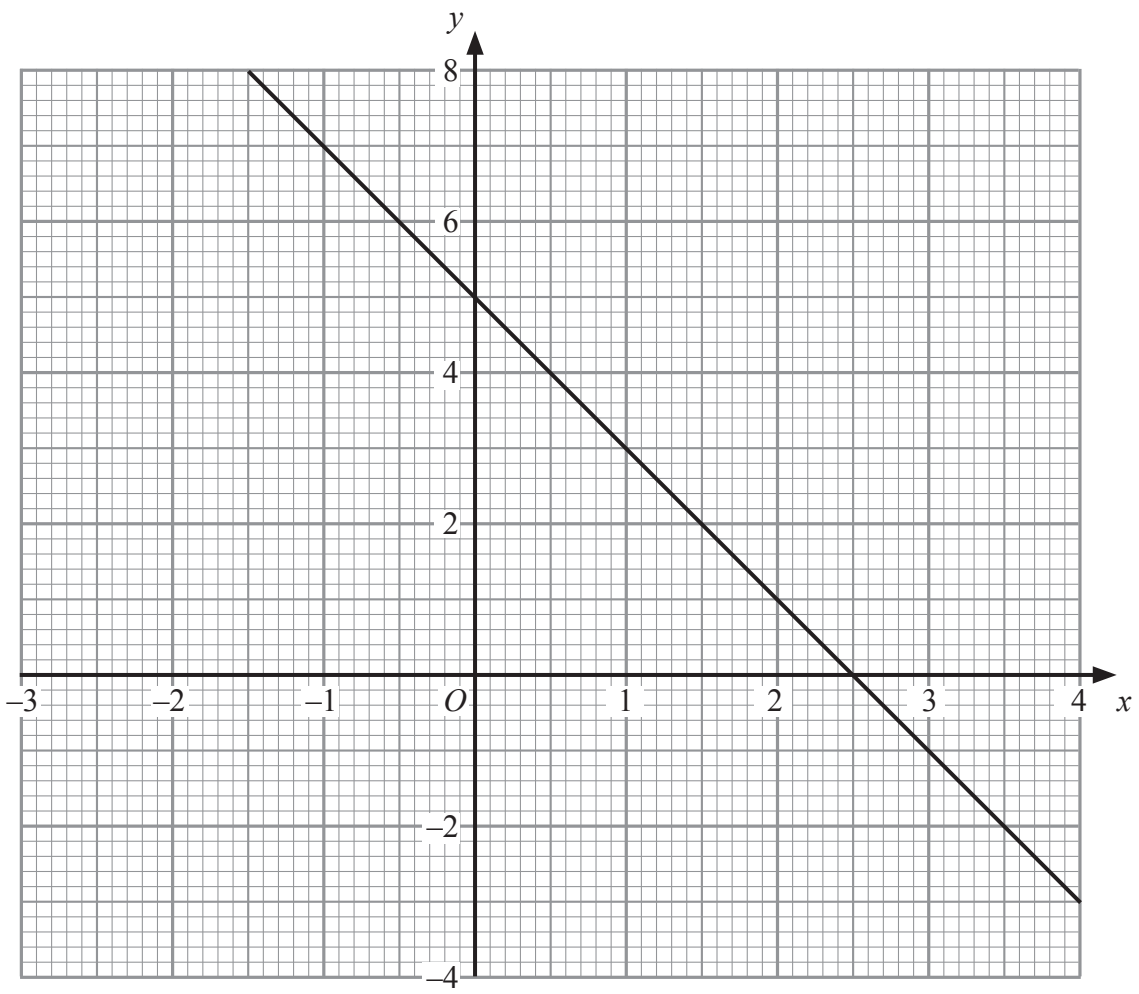
Q7

(Total 3 marks)

Turn over

Leave blank

8. The straight line $y + 2x = 5$ has been drawn on the grid.



(a) Complete this table of values for $y = 2x - 1$

x	–1	0	1	2	3	4
y		–1		3	5	

(2)

(b) On the grid, draw the graph of $y = 2x - 1$

(2)

(c) Use your diagram to solve the simultaneous equations

$y + 2x = 5$

$y = 2x - 1$

$x =$ .....

$y =$ **Q8**

(2)

(Total 6 marks)

Leave blank

9. (a) Factorise completely $3a^2 - 6a$

.....

(2)

(b) Make q the subject of the formula $P = 2q + 10$

$q =$ .....

(2)

(c) Expand and simplify $(y + 3)(y - 4)$

.....

(2)

(d) Factorise $4p^2 - 9q^2$

.....

(2) **Q9**

(Total 8 marks)

Leave blank

10. (a) (i) Write 7900 in standard form.

.....

(ii) Write 0.00035 in standard form.

.....

(2)

(b) Work out $\dfrac{4\times10^{3}}{8\times10^{-5}}$

Give your answer in standard form.

.....

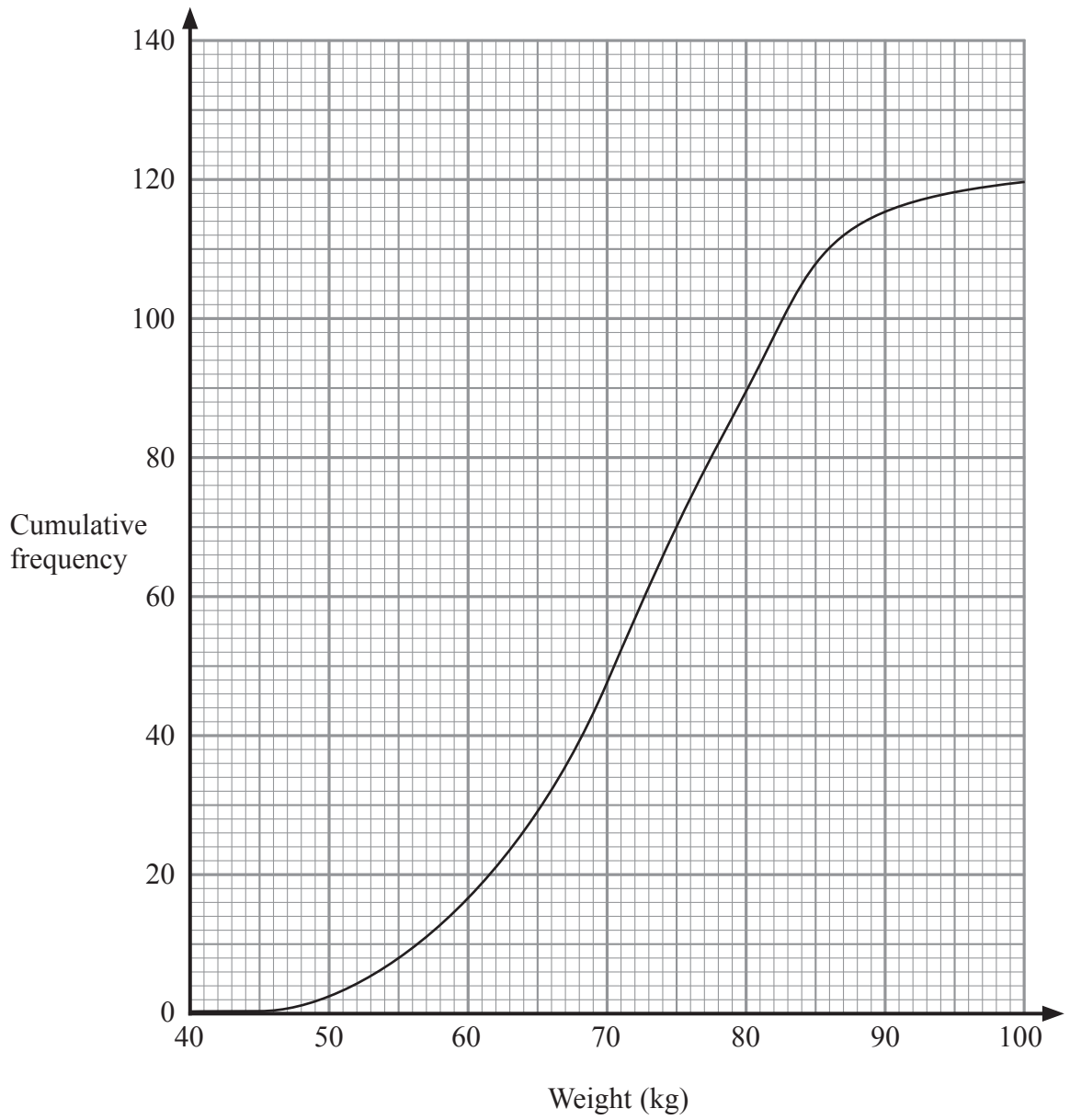
(2)

Q10

(Total 4 marks)

Leave blank

11. Here is the cumulative frequency curve of the weights of 120 girls at Mayfield Secondary School.



Use the cumulative frequency curve to find an estimate for the

(i) median weight,

..... kg

(ii) interquartile range of the weights.

..... kg

(Total 3 marks)

Q11

Turn over

Leave blank

12.

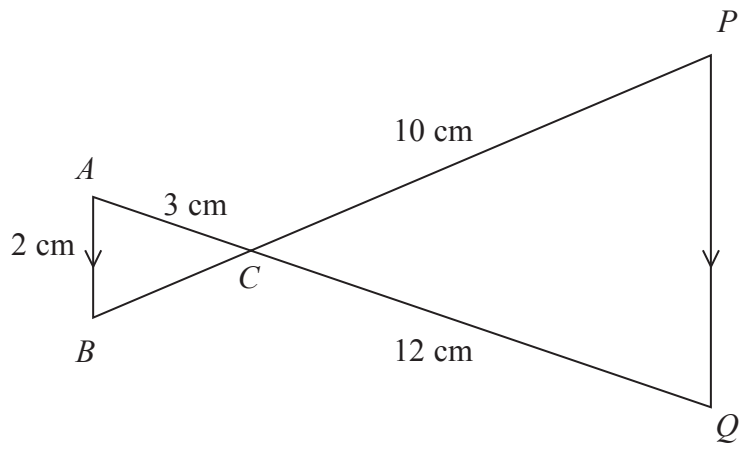


Diagram **NOT** accurately drawn

ACQ and *BCP* are straight lines.
AB is parallel to *PQ*.
AB = 2 cm.
AC = 3 cm.
CQ = 12 cm.
CP = 10 cm.

(a) Work out the length of *PQ*.

..... cm
(2)

(b) Work out the length of *BP*.

..... cm
(3)

Q12

(Total 5 marks)

Leave blank

13. Sarah wants to survey students in her school about which vegetables they eat.

These vegetables are on the menu in the school canteen.

carrots peas cauliflower broccoli swede

(a) Design a suitable question she could use for a questionnaire to find out which of these vegetables each student eats.

(2)

There are 800 students in Sarah's school.

Sarah selects 50 students at random.
30 of these 50 students eat carrots.

(b) Work out an estimate for the number of students in Sarah's school who eat carrots.

.....

(2) **Q13**

(Total 4 marks)

14. $-6 \leqslant 2y < 5$

y is an integer.
Write down all the possible values of y.

.....

Q14

(Total 3 marks)

Leave blank

15. A cuboid has length 3 cm, width 4 cm and height 12 cm.

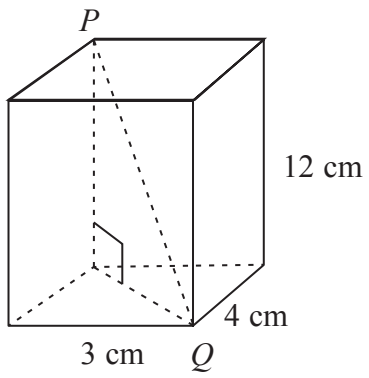


Diagram **NOT** accurately drawn

Work out the length of PQ.

..... cm

(Total 3 marks)

Q15

16. (a) Simplify $(a^2)^4$

.....

(1)

$2^{30} \div 8^9 = 2^x$

(b) Work out the value of x.

$x =$ .....

(2)

(Total 3 marks)

Q16

Leave blank

17. Here are the equations of 5 straight lines.

P	$y = 2x + 5$	**Q**	$y = -2x + 5$
R	$y = x + 5$	**S**	$y = -\frac{1}{2}x + 6$
T	$y = \frac{1}{2}x + 1$		

(a) Write down the letter of the line that is parallel to $y = x + 6$

.....

(1)

(b) Write down the letter of the line that is perpendicular to $y = 2x - 1$

.....

(1)

(c) Find the coordinates of the point where the line $y = 2x + 5$ cuts the

(i) y axis,

(..... , ...)

(ii) x axis.

(..... , ...)

(2)

(Total 4 marks)

Q17

18. Here are the first 4 lines of a number pattern.

$1 + 2 + 3 + 4$	=	$(4 \times 3) - (2 \times 1)$
$2 + 3 + 4 + 5$	=	$(5 \times 4) - (3 \times 2)$
$3 + 4 + 5 + 6$	=	$(6 \times 5) - (4 \times 3)$
$4 + 5 + 6 + 7$	=	$(7 \times 6) - (5 \times 4)$

n is the first number in the nth line of the number pattern.

Show that the above number pattern is true for the four consecutive integers

n, $(n + 1)$, $(n + 2)$ and $(n + 3)$

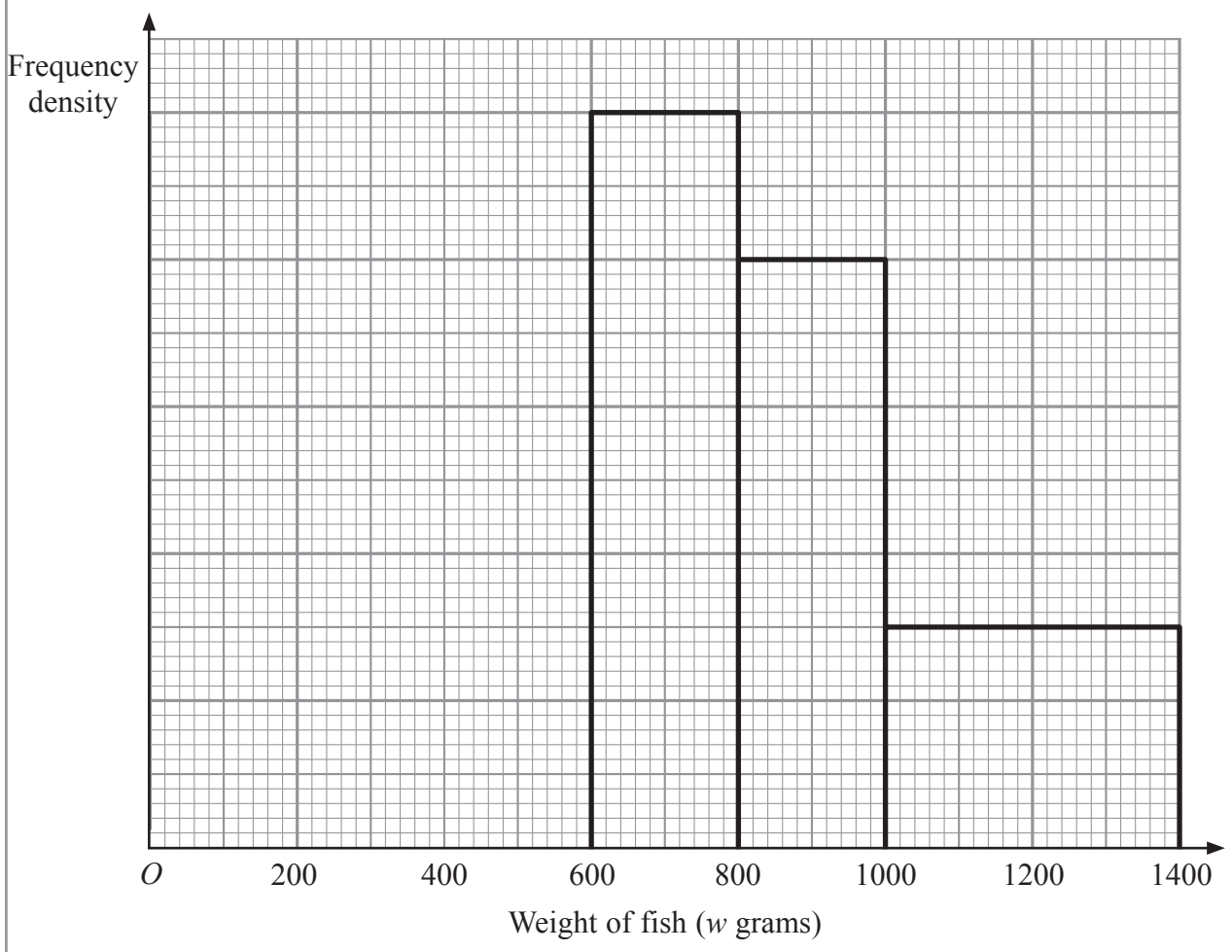
Q18

(Total 4 marks)

Leave blank

19. The unfinished table and histogram show information about the weight, w grams, of fish that Alan caught each day.

Weight (w grams)	**Frequency**
$0 < w \leqslant 400$	8
$400 < w \leqslant 600$	5
$600 < w \leqslant 800$	10
$800 < w \leqslant 1000$	
$1000 < w \leqslant 1400$	



(a) Use the information in the histogram to complete the table.

(2)

(b) Use the information in the table to complete the histogram.

(2) **Q19**

(Total 4 marks)

Leave blank

20.

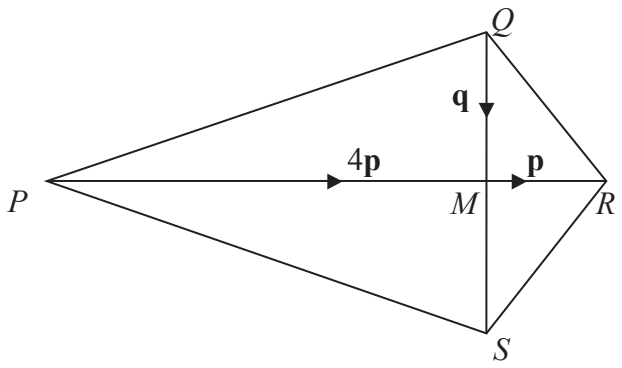


Diagram **NOT** accurately drawn

PQRS is a kite.
The diagonals *PR* and *QS* intersect at *M*.

$\overrightarrow{PM} = 4\mathbf{p}$

$\overrightarrow{QM} = \mathbf{q}$

$\overrightarrow{MR} = \mathbf{p}$

$\overrightarrow{QM} = \overrightarrow{MS}$

(a) Find expressions, in terms of **p** and/or **q** for

(i) $\overrightarrow{PR}$

$\overrightarrow{PR}$ .....

(ii) $\overrightarrow{QS}$

$\overrightarrow{QS}$ .....

(iii) $\overrightarrow{PQ}$

$\overrightarrow{PQ}$ .....

(4)

SR and *PQ* are extended to meet at point *T*.
Q is the midpoint of *PT*.

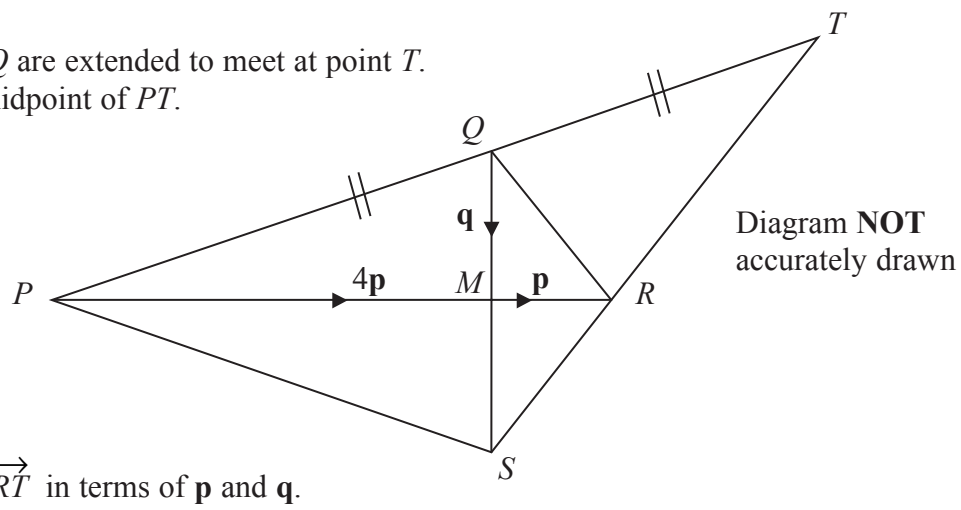


Diagram **NOT** accurately drawn

(b) Find $\overrightarrow{RT}$ in terms of **p** and **q**.

$\overrightarrow{RT}$ .....

(4)

(Total 8 marks)

Q20

Leave blank

21. The volumes of two mathematically similar solids are in the ratio 27 : 125

The surface area of the smaller solid is 36 cm^2.

Work out the surface area of the larger solid.

..... cm^2 **Q21**

(Total 3 marks)

22. Solve the equation

$$\frac{3}{x+3}-\frac{4}{x-3}=\frac{5x}{x^2-9}$$

x = ... **Q22**

(Total 4 marks)

Leave blank

23. The table shows the number of boys and the number of girls in each year group at Springfield Secondary School.

There are 500 boys and 500 girls in the school.

Year group	Number of boys	Number of girls
7	100	100
8	150	50
9	100	100
10	50	150
11	100	100
Total	500	500

Azez took a stratified sample of 50 girls, by year group.

Work out the number of Year 8 girls in his sample.

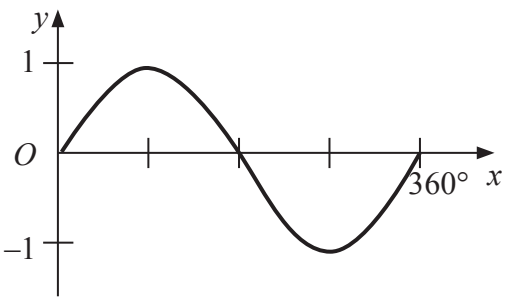
.....

Q23

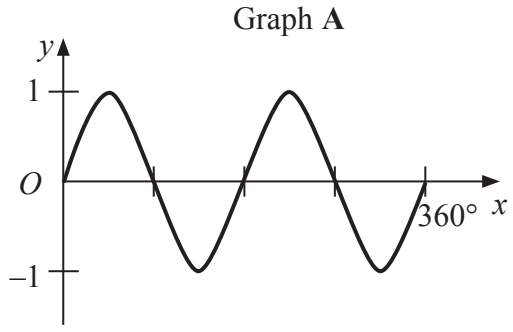
(Total 2 marks)

Leave blank

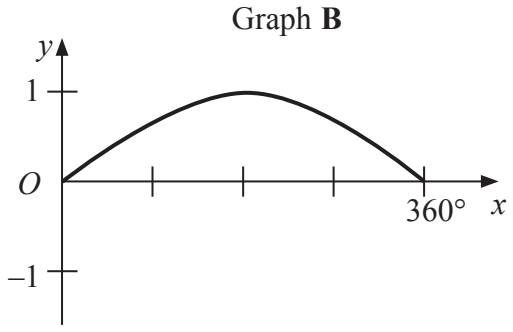
24. Here is the graph of $y = \sin x$, where $0° \leqslant x \leqslant 360°$



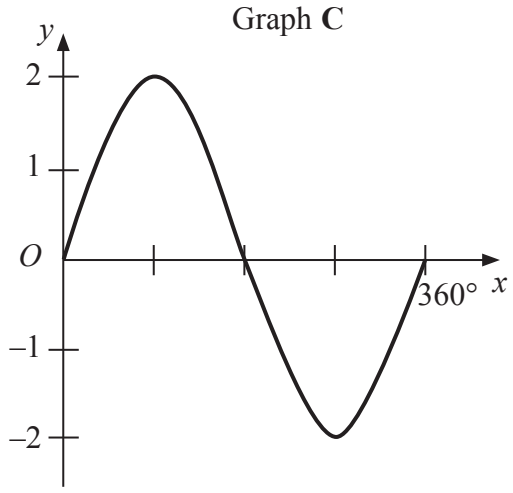
Graph **A**



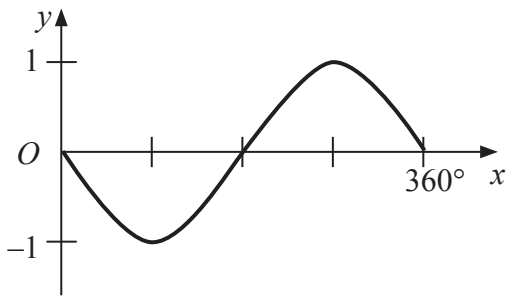
Graph **B**



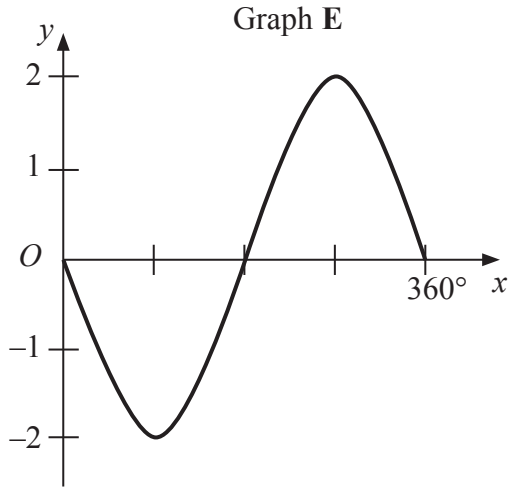
Graph **C**



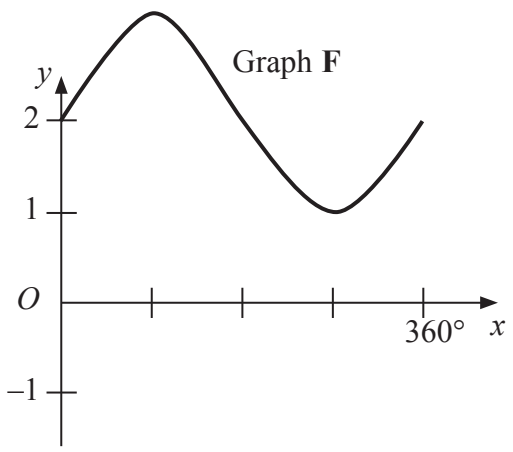
Graph **D**



Graph **E**



Graph **F**



Leave blank

Match each of the graphs **A**, **B**, **C**, **D**, **E** and **F** to the equations in the table.

Equation	Graph
$y = 2 \sin x$	
$y = -\sin x$	
$y = \sin 2x$	
$y = \sin x + 2$	
$y = \sin \frac{1}{2}x$	
$y = -2 \sin x$	

Q24

(Total 4 marks)

TOTAL FOR PAPER: 100 MARKS

END

BLANK PAGE

BLANK PAGE

BLANK PAGE