

Edexcel Style

**GCSE Mathematics
Past Paper Questions**

Arranged by Topic

1MA0

by Peter Bland



GCSE Mathematics 1MA0

Formulae: Higher Tier

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

Volume of prism = area of cross section \times length

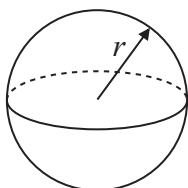


Area of trapezium = $\frac{1}{2} (a + b)h$



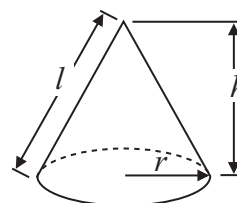
Volume of sphere = $\frac{4}{3} \pi r^3$

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

Write your name here

Surname

Other names

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Mathematics A

A* Type Questions 1H

Higher Tier

Extra topics that occur less frequently,
for students working towards an A*

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks



Instructions

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1. Solve the equation $\frac{x}{2} - \frac{2}{x+1} = 1$

..... Q1

(Total 4 marks)



2. The diagram shows a solid wax cylinder.

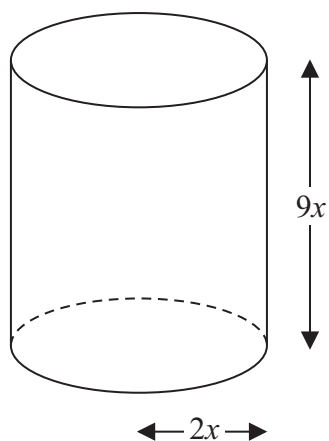


Diagram **NOT**
accurately drawn

The cylinder has base radius $2x$ and height $9x$.

The cylinder is melted down and made into a sphere of radius r .

Find an expression for r in terms of x .

.....
(Total for Question 2 is 3 marks)



3.

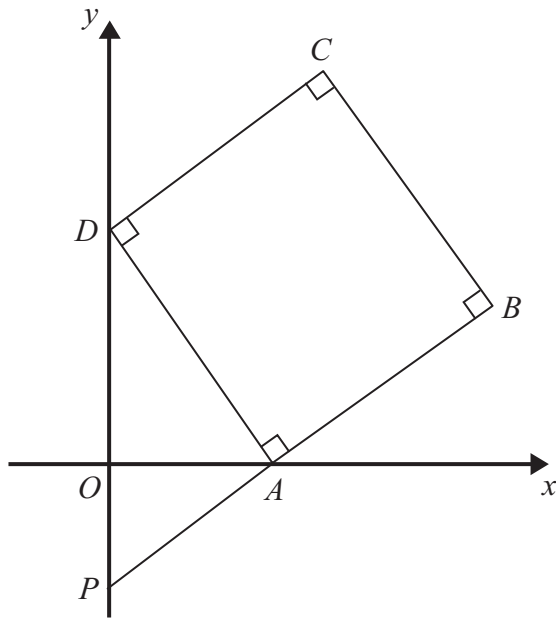


Diagram **NOT**
accurately drawn

$ABCD$ is a square.

P and D are points on the y -axis.

A is a point on the x -axis.

PAB is a straight line.

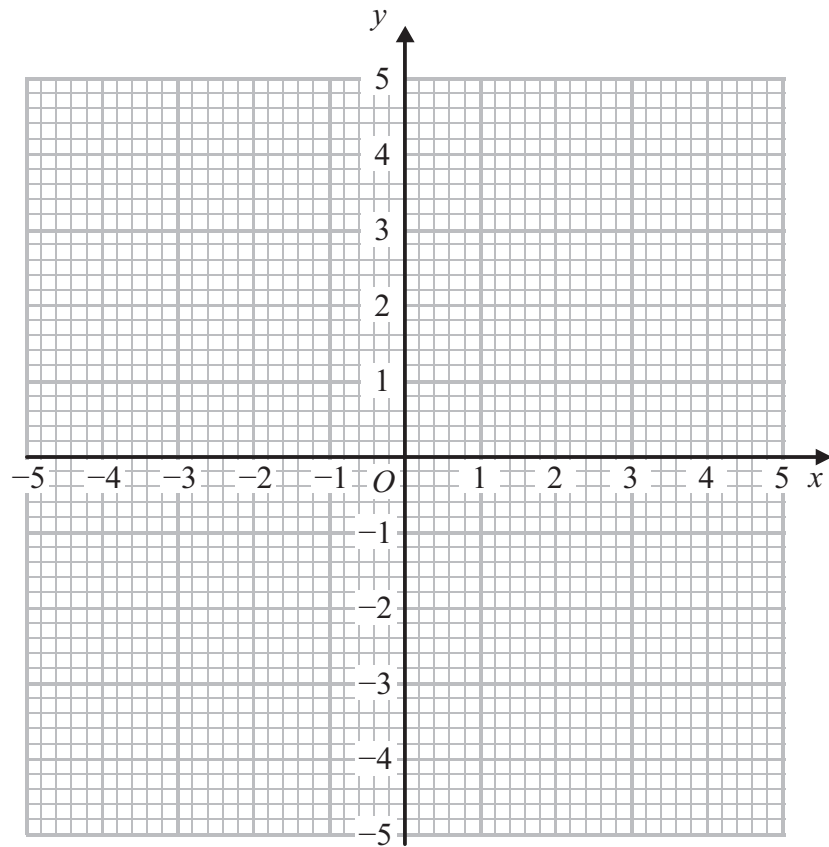
The equation of the line that passes through the points A and D is $y = -2x + 5$

Find the length of PD .

.....
(Total for Question 3 is 4 marks)

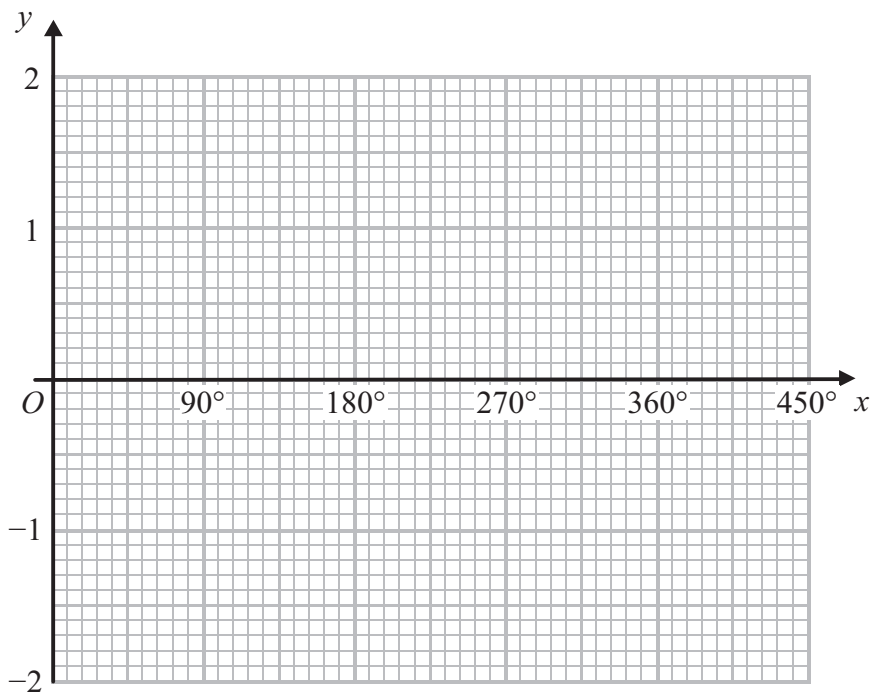


4.



(a) On the grid, draw the graph of $x^2 + y^2 = 4$

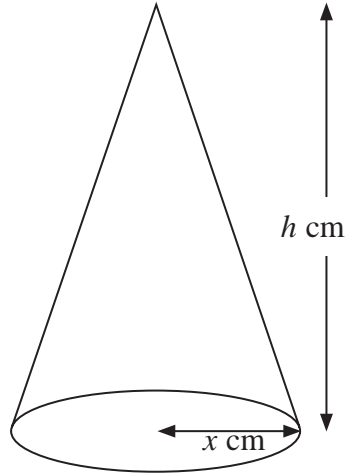
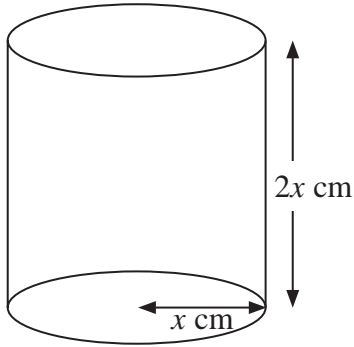
(2)



(b) On the grid, sketch the graph of $y = \cos x$ for $0^\circ \leq x \leq 360^\circ$



5.



Diagrams **NOT** accurately drawn

A cylinder has base radius x cm and height $2x$ cm.

A cone has base radius x cm and height h cm.

The volume of the cylinder and the volume of the cone are equal.

Find h in terms of x .

Give your answer in its simplest form.

$h = \dots\dots\dots$

Q5

(Total 3 marks)



6.

$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$u = 2\frac{1}{2}, v = 3\frac{1}{3}$$

(a) Find the value of f .

.....
(3)

(b) Rearrange $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

to make u the subject of the formula.

Give your answer in its simplest form.

.....
(2)

(Total 5 marks)

Q6



7.

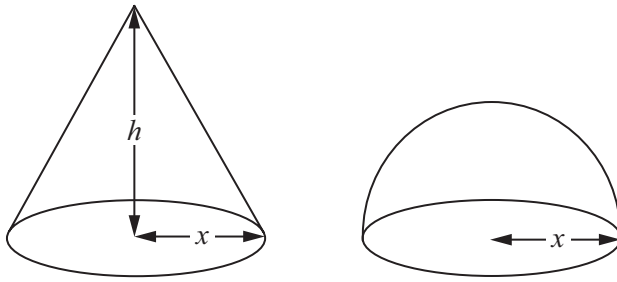


Diagram **NOT**
accurately drawn

The diagram shows a solid cone and a solid hemisphere.

The cone has a base of radius x cm and a height of h cm.

The hemisphere has a base of radius x cm.

The surface area of the cone is equal to the surface area of the hemisphere.

Find an expression for h in terms of x .

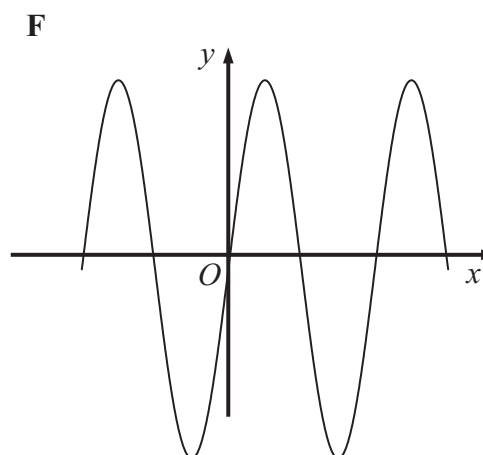
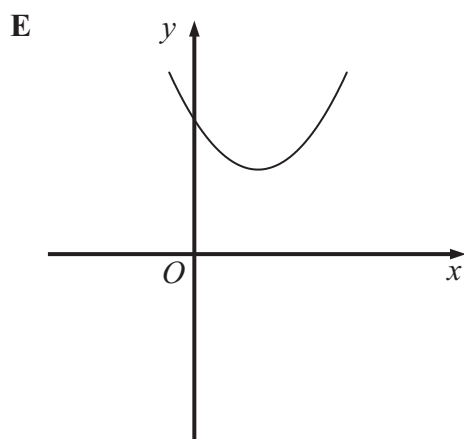
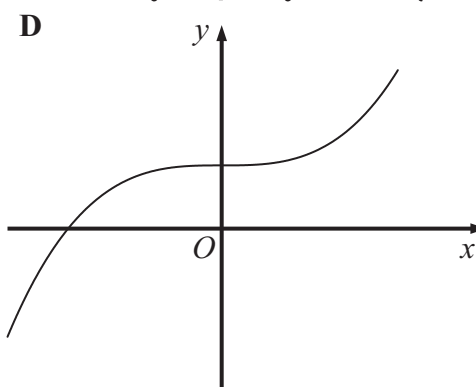
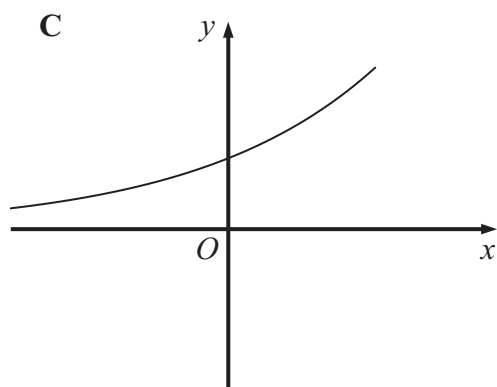
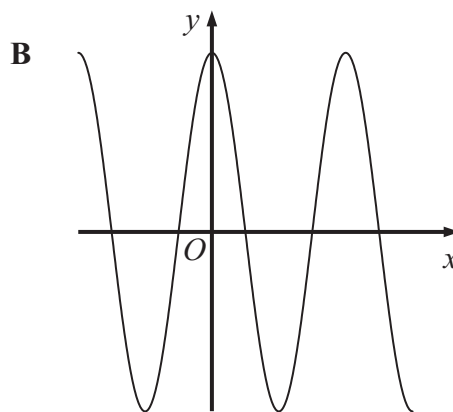
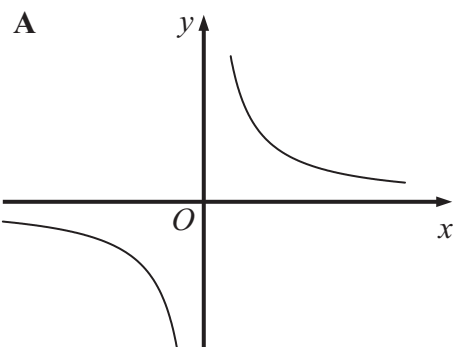
.....

Q7

(Total 4 marks)



8.



Each equation in the table represents one of the graphs A to F.

Write the letter of each graph in the correct place in the table.

Equation	Graph
$y = 4 \sin x^\circ$	
$y = 4 \cos x^\circ$	
$y = x^2 - 4x + 5$	
$y = 4 \times 2^x$	
$y = x^3 + 4$	
$y = \frac{4}{x}$	

(Total 3 marks)

Q8



9. Here is a shape $ABCDE$.

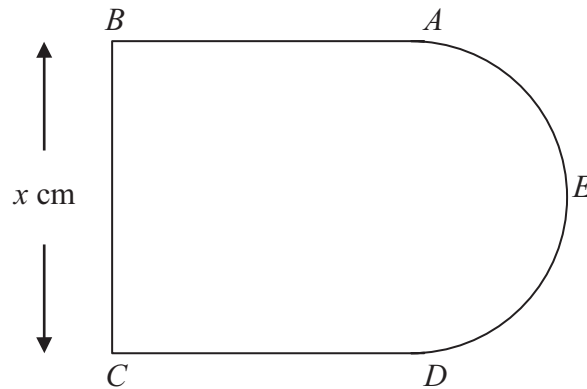


Diagram **NOT**
accurately drawn

AB , BC and CD are three sides of a square.

$BC = x$ cm.

AED is a semicircle with diameter AD .

The perimeter, P cm, of the shape $ABCDE$ is given by the formula

$$P = 3x + \frac{\pi x}{2}$$

(a) Rearrange this formula to make x the subject.

.....
(2)



The area, $A \text{ cm}^2$, of this shape is given by $A = kx^2$ where k is a constant.

- (b) Find the exact value of k .
Give your answer in its simplest form.

.....
(3) Q9

(Total 5 marks)



10. Express the recurring decimal $0.2\dot{1}\dot{3}$ as a fraction.

..... Q10
(Total 3 marks)



11.

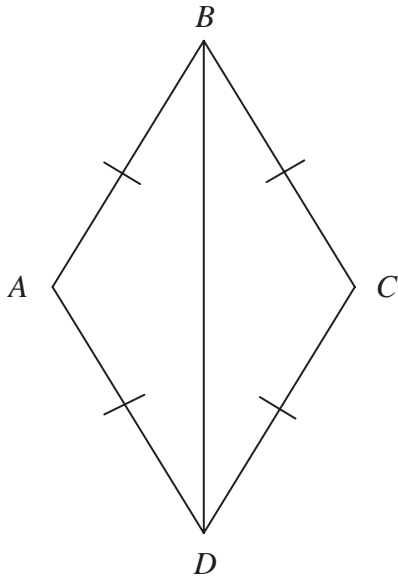


Diagram **NOT**
accurately drawn

In the diagram, $AB = BC = CD = DA$.

Prove that triangle ADB is congruent to triangle CDB .

Q11

(Total 3 marks)



12. Prove, using algebra, that the sum of two consecutive whole numbers is always an odd number.

(Total 3 marks)



13. The table shows information about the ages, in years, of 1000 teenagers.

Age (years)	13	14	15	16	17	18	19
Number of teenagers	158	180	165	141	131	115	110

Sophie takes a sample of 50 of these teenagers, stratified by age.

Calculate the number of 14 year olds she should have in her sample.

..... Q13
(Total 2 marks)

14. P is inversely proportional to V .

When $V = 8$, $P = 5$

(a) Find a formula for P in terms of V .

$P = \dots\dots\dots$
(3)

(b) Calculate the value of P when $V = 2$

..... Q14
(1)

(Total 4 marks)



15.

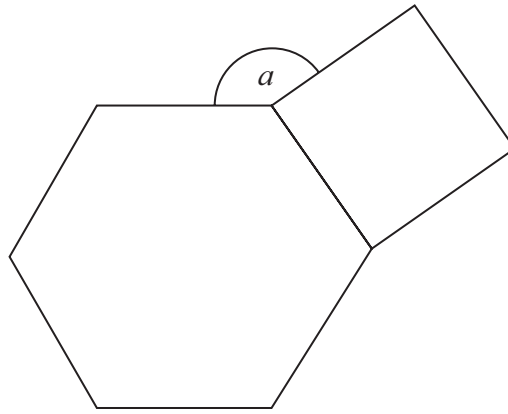


Diagram **NOT**
accurately drawn

The diagram shows a regular hexagon and a square.

Calculate the size of the angle a .

.....^o **Q15**
(Total 4 marks)



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Mathematics A

A* Type Questions 2H

Higher Tier

Extra topics that occur less frequently,
to help students working towards an A*

Paper Reference

1MA0/2H

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Turn over ►



1. 258 Year 9 were choosing the subjects they would be taking in Year 10. The table shows information about these students.

	Subject to be studied		
	Geography	History	Spanish
Male	45	52	26
Female	25	48	62

A sample, stratified by the subject studied and by gender, of 50 of the 258 students is taken.

- (a) Work out the number of male students studying Spanish in the sample.

.....
(2)

- (b) Work out the number of female students in the sample.

.....
(2) Q1

(Total 4 marks)

2. Prove that $(3x + 1)^2 - (3x - 1)^2$ is a multiple of 4, for all positive integer values of x .

Q2

(Total 3 marks)



3.

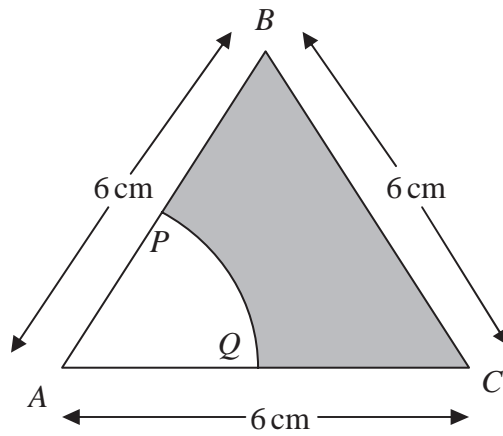


Diagram **NOT**
accurately drawn

The diagram shows an equilateral triangle ABC with sides of length 6 cm .

P is the midpoint of AB .

Q is the midpoint of AC .

APQ is a sector of a circle, centre A .

Calculate the area of the shaded region.

Give your answer correct to 3 significant figures.

..... cm^2

Q3

(Total 4 marks)



4. Make A the subject of the formula

$$x = \sqrt{\frac{A}{3}}$$

$A = \dots\dots\dots$ **Q4**

(Total 2 marks)

5. (a) Write 12 500 in standard form.

.....
(1)

(b) Write 2.48×10^{-3} as an ordinary number.

.....
(1)

(c) Work out the value of

$$23\,500 \div (1.25 \times 10^{-4})$$

Give your answer in standard form.

.....
(2) Q5

(Total 4 marks)



6. **X** and **Y** are two solid shapes which are mathematically similar.
The shapes are made from the same material.

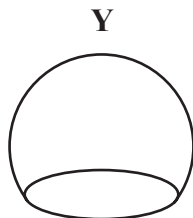
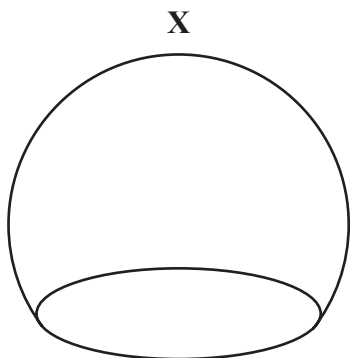


Diagram **NOT**
accurately drawn

The surface area of **X** is 50 cm^2 .

The surface area of **Y** is 18 cm^2 .

The mass of **X** is 500 grams.

Calculate the mass of **Y**.

..... grams

(Total 4 marks)



7. The diagram shows a sector of a circle with centre O .
The radius of the circle is 8 cm.

XYZ is an arc of the circle.

XZ is a chord of the circle.

Angle $XOZ = 40^\circ$

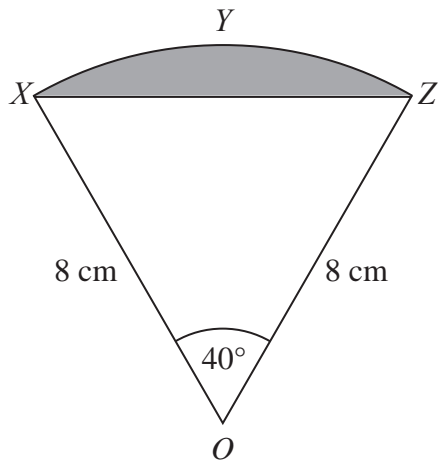


Diagram **NOT**
accurately drawn

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

..... cm²

(Total 5 marks)



8. The table shows six expressions.
 x is a positive integer.

$2x - 3$	$3x - 2$	$3(x + 4)$	$4x + 1$	$4(3x + 1)$	$2x + 1$
----------	----------	------------	----------	-------------	----------

(a) From the table, write the expression whose value is

(i) always even

.....

(ii) always a multiple of 3

.....

(2)

(b) From the table, write the expression which is a factor of $4x^2 - 1$

.....

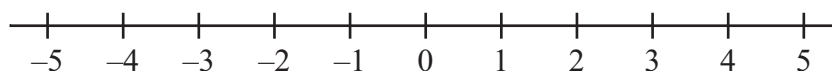
(1)

Q8

(Total 3 marks)

9. (a) $n > -3$

Show this inequality on the number line.



(2)

(b) Solve the inequality $7x + 36 \leq 8$

.....

(2) Q9

(Total 4 marks)



10. In a sale the normal price of a pen is reduced by 10%.

The sale price of the pen is £4.86

Calculate the normal price of the pen.

£.....

Q10

(Total 3 marks)



11. The diagram shows two similar triangles.

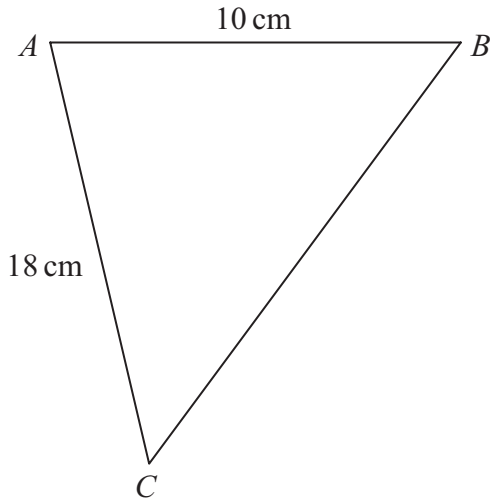
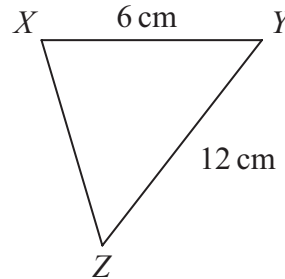


Diagram **NOT** accurately drawn



In triangle ABC , $AB = 10$ cm and $AC = 18$ cm.
In triangle XYZ , $XY = 6$ cm and $YZ = 12$ cm.

Angle $ABC =$ angle XYZ .
Angle $CAB =$ angle ZXY .

(a) Calculate the length of BC .

..... cm
(2)

(b) Calculate the length of XZ .

..... cm

(2) Q11

(Total 4 marks)



12. The surface area of Venus is $510\,072\,000\text{ km}^2$.
The surface area of Jupiter is $6.21795 \times 10^{10}\text{ km}^2$.

The surface area of Jupiter is greater than the surface area of Venus.
How many times greater?
Give your answer in standard form.



13. The table shows some expressions.

w , x , y and z represent lengths.

π and 2 are numbers that have no dimensions.

$y^2(x+z)$	$\pi w^2 y^2$	$\frac{w^3 x}{y^3}$	$\pi w^2 x$	$\frac{2w^3 z}{y}$	z^2	$2w + x^2$

Tick (✓) the boxes underneath the **three** expressions which could represent volumes.

Q13

(Total 3 marks)



14. There are three big employment sites in Knutsford.
The table shows the number of employees in each of these sites.

Barclays	Longridge	Parkgate
750	700	900

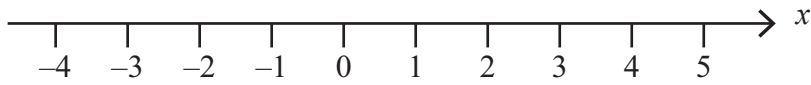
Georgina takes a sample of 50 employees stratified by site. Work out the number of employees from Longridge in the sample.

..... Q14

(Total 2 marks)

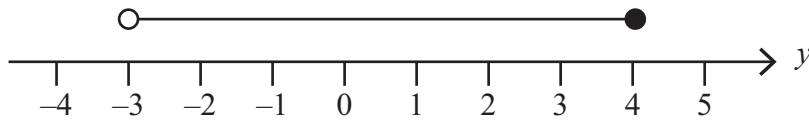


15. (a) On the number line below, show the inequality $-2 < x < 3$



(1)

(b) Here is an inequality, in y , shown on a number line.



Write down the inequality.

.....
(2)

(c) Solve the inequality $4t - 5 > 9$

.....
(2) Q15

(Total 5 marks)



16.

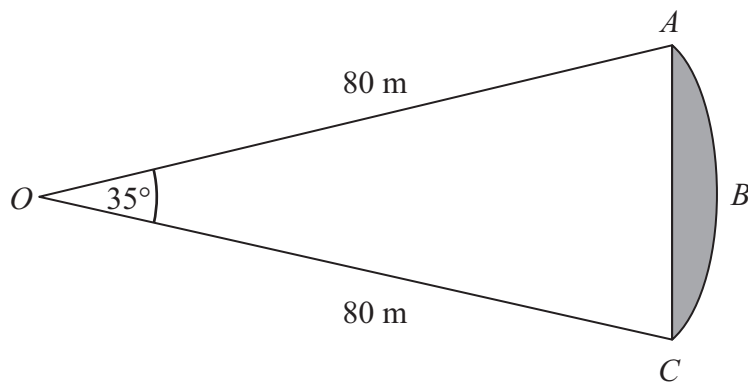


Diagram **NOT**
accurately drawn

ABC is an arc of a circle centre O with radius 80 m .
 AC is a chord of the circle.
Angle $AOC = 35^\circ$.

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

Q16 m^2

(Total 5 marks)



17. The table below gives some information about some students in a school.

Year group	Boys	Girls	Total
Year 12	126	94	220
Year 13	77	85	162
Total	203	179	382

Andrew is going to carry out a survey of these students.
He uses a sample of 50 students, stratified by year group and gender.

Work out the number of Year 13 girls that should be in his sample.

..... Q17
(Total 2 marks)

18. y is directly proportional to x .

When $x = 500$, $y = 10$

(a) Find a formula for y in terms of x .

$y = \dots\dots\dots$
(3)

(b) Calculate the value of y when $x = 350$

$y = \dots\dots\dots$ Q18
(1)

(Total 4 marks)



19. A and B are vertices of a cuboid.

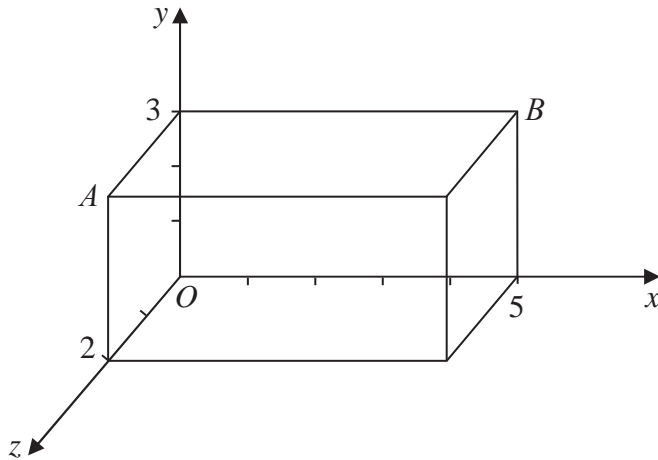


Diagram **NOT** accurately drawn

(a) Write down the coordinates of point A .

(..... , ,)
(1)

(b) Write down the coordinates of point B .

(..... , ,)
(1)

Q19

(Total 2 marks)

20. (a) Write 83 500 000 in standard form.

.....
(1)

(b) Work out $(5.2 \times 10^{-7}) \times (2.8 \times 10^{-9})$

Give your answer in standard form.

.....
(2)

Q20

(Total 3 marks)



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Mathematics A

Algebra

Foundation Tier

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1. Peter thinks of a number.

He multiplies the number by 3

He then adds 2

His answer is 20

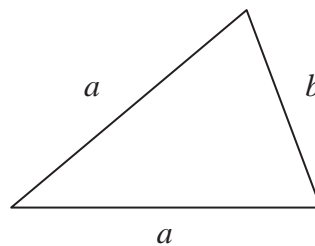
(a) What number did Peter think of?

.....
(2)

Sophie uses the formula $P = 2a + b$
to find the perimeter P of this triangle.

(b) Find the value of P when

$a = 6$ and $b = 4$



$P =$
(2)

(Total 4 marks)

2. (a) Work out the value of

(i) 4^2

.....

(ii) $\sqrt{64}$

.....

(iii) 3×2^3

.....
(3)

(b) Work out

(i) $-3 + 5$

.....

(ii) $-2 - 3$

.....
(2)



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

$$\text{Cost} = \text{£}80 + 50\text{p per mile}$$

Bill hires a car and drives 90 miles.

(a) Work out the cost.

£
(2)

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

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

$C =$
(2)

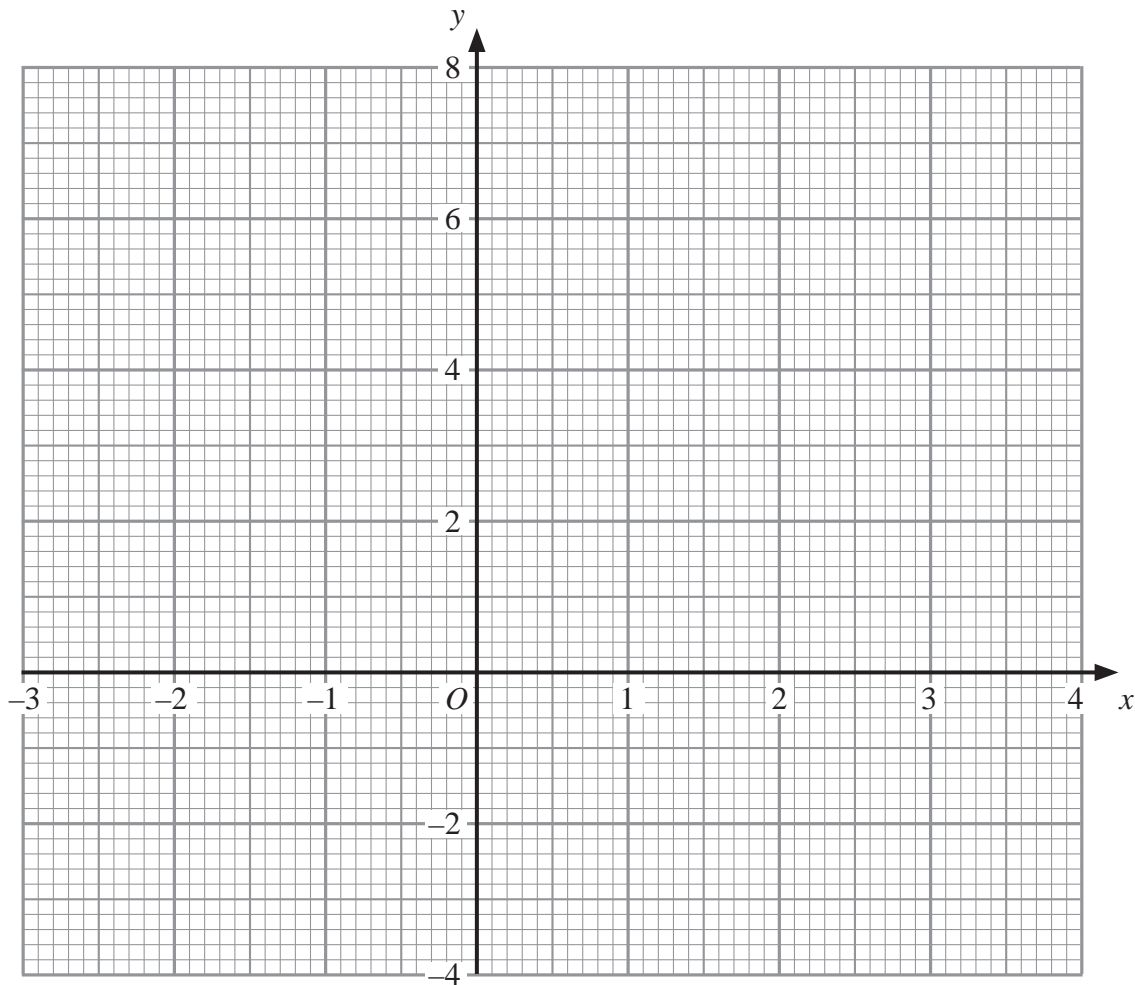
(Total 4 marks)



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

x	-1	0	1	2	3	4
y		-1		3	5	

(2)



(2)

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

(Total 4 marks)



5. Work out an estimate for the value of $\frac{31 \times 4.92}{0.21}$

.....

(Total 3 marks)

6. (a) Expand $y(2y - 3)$

.....
(1)

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

.....
(2)

k is an integer such that $-1 \leq k < 3$

(c) List all the possible values of k .

.....
(2)

(Total 5 marks)



7. (a) Factorise $x^2 - 5x$

.....
(2)

(b) Expand $3(5x - 2)$

.....
(1)

(Total 3 marks)

8. A hotel has 64 guests.
40 of the guests are male.

(a) Work out 40 out of 64 as a percentage.

..... %
(2)

40% of the 40 male guests wear glasses.

(b) Write the number of male guests who wear glasses as a fraction of the 64 guests.
Give your answer in its simplest form.

.....
(4)

(Total 6 marks)



9. (a) Simplify $8x - 4x$

.....
(1)

(b) Simplify $y \times y \times y$

.....
(1)

(c) Simplify $5y + 4x - 2x + 5x$

.....
(2)

(Total 4 marks)



10. The two-way table gives some information about how 100 children travelled to school one day.

	Walk	Car	Dmg	Total
Boy	15		14	54
Girl		8	16	
Total	37			100

(a) Complete the two-way table.

(3)

One of the children is picked at random.

(b) Write down the probability that this child walked to school that day.

.....
(1)

One of the girls is picked at random.

(c) Work out the probability that this girl did **not** walk to school that day.

.....
(2)

(Total 6 marks)

11. ApApples cost a pence eachples

BaBananas cost b npence each.

Write down an expression for the total cost, in pence, of 2 apples and 4 bananas.banan.

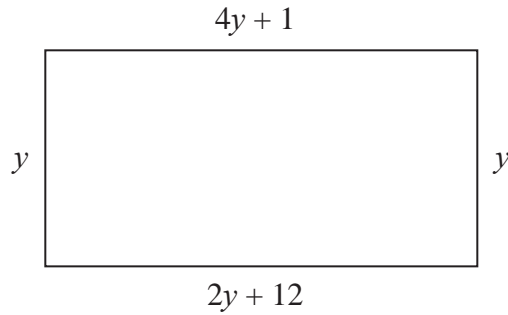
..... pence

(Total 2 marks)



14.

Diagram **NOT**
accurately drawn



The diagram shows a rectangle.

All the measurements are in centimetres.

(a) Explain why $4y + 1 = 2y + 12$

..... (1)

(b) Solve $4y + 1 = 2y + 12$

$y =$ (2)

(c) Use your answer to part (b) to work out the perimeter of the rectangle.

..... cm (2)

(Total 5 marks)



15. (a) Simplify $5ab + 2ab - 4ab$

.....
(1)

(b) Simplify $4a + 3b - 2a + 2b$

.....
(2)

(c) Simplify $n \times n \times n$

.....
(1)

(d) Simplify $3m \times 2q$

.....
(1)

(e) Factorise $5n + 10$

.....
(1)

(Total 6 marks)



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Mathematics A

Bearings

Foundation Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks



Instructions

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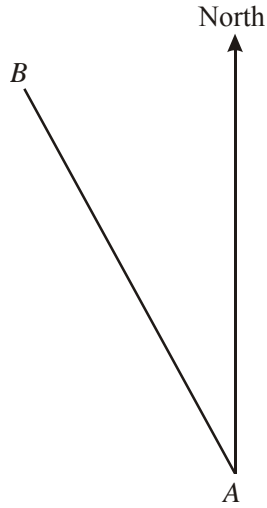
Advice

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Turn over ►



1.



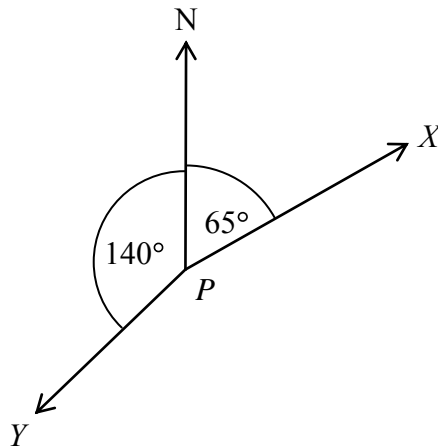
(a) Measure and write down the bearing of B from A .

.....^o
(1)

(b) On the diagram, draw a line on a bearing of 103° from A .

(1)
(Total 2 marks)

2.



(a) Write down the bearing of X from P .

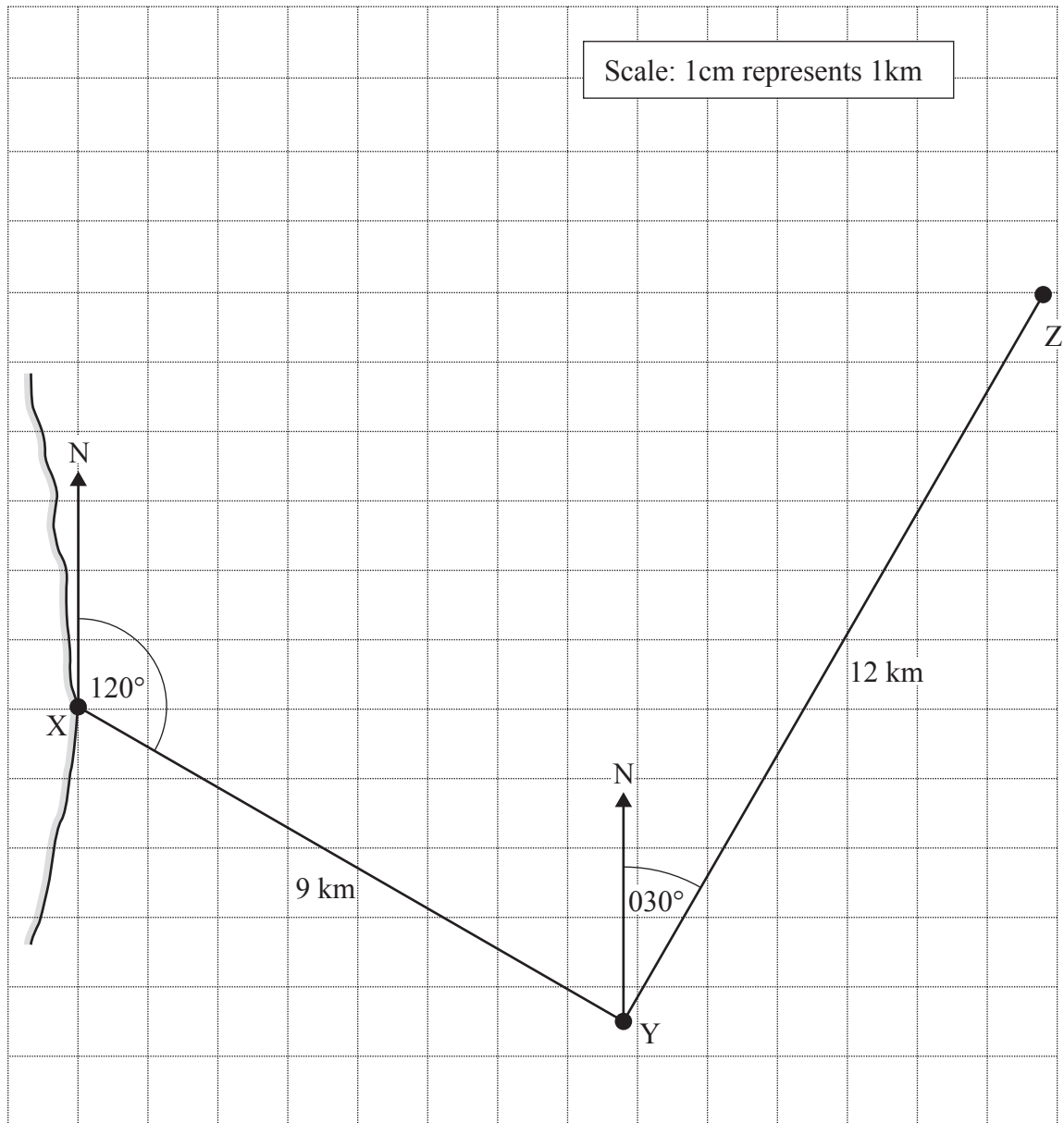
.....^o
(1)

(b) Work out the bearing of Y from P .

.....^o
(2)



3. A ship leaves port X and travels 9 km on a bearing of 120° to point Y. The ship then turns and travels 12 km on a bearing of 030° to point Z. This journey is shown on the scale drawing below.



The ship then turns and travels directly back from Z to X.

Use a ruler and protractor to work out the distance and bearing of the journey from Z to X

Distance

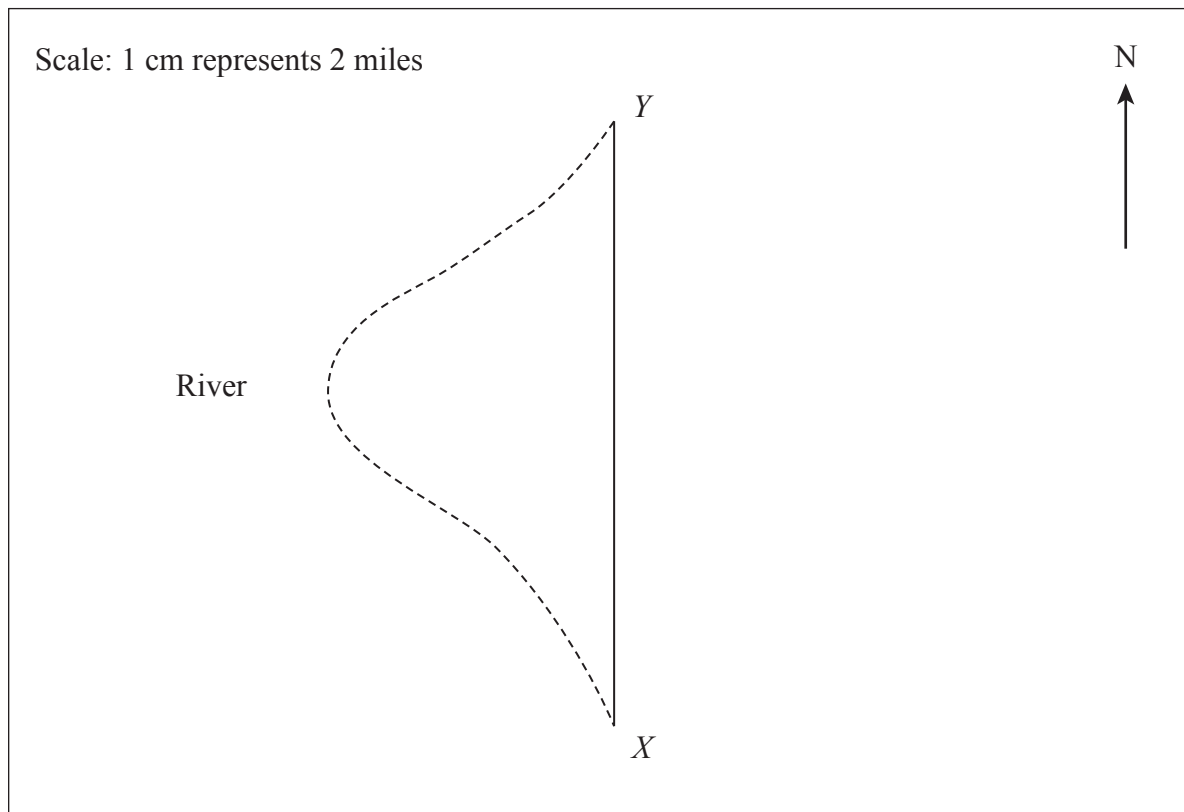
km

Bearing..... $^\circ$

(3)



4. An helicopter flies due North from X to Y .
The distance from X to Y on the river is 24 miles.



- 4 (a) How much further is it from X to Y on the river than by helicopter?

..... miles

- (b) Z is 12 miles north-east of X (3)

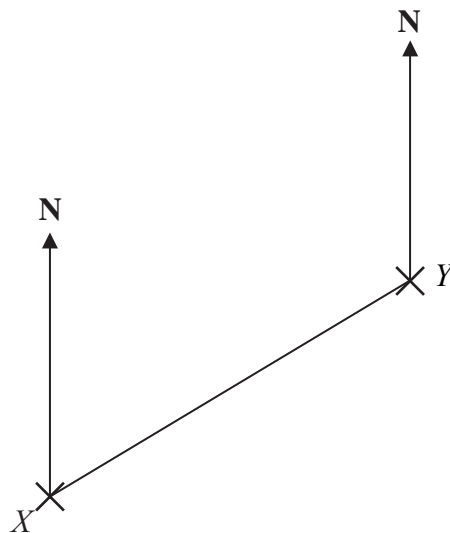
- (i) Mark with a cross the point Z on the diagram. (2)

- (ii) Write down the three-figure bearing of Z from X °
(1)

(Total 6 marks)



5. The diagram shows the positions of two telephone masts, X and Y , on a map.



(a) Measure the bearing of Y from X .

.....^o
(1)

Another mast Z is on a bearing of 160° from Y .

On the map, Z is 4 cm from Y .

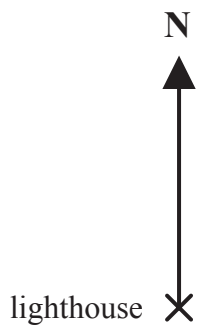
(b) Mark the position of Z with a cross (X) and label it Z .

(2)

(Total 3 marks)



6. The diagram shows part of a map.
It shows the positions of a lighthouse and a boat.



The scale of the map is 1:10 000

- (a) Work out the real distance between the lighthouse and the boat.
Give your answer in metres.

..... m
(2)

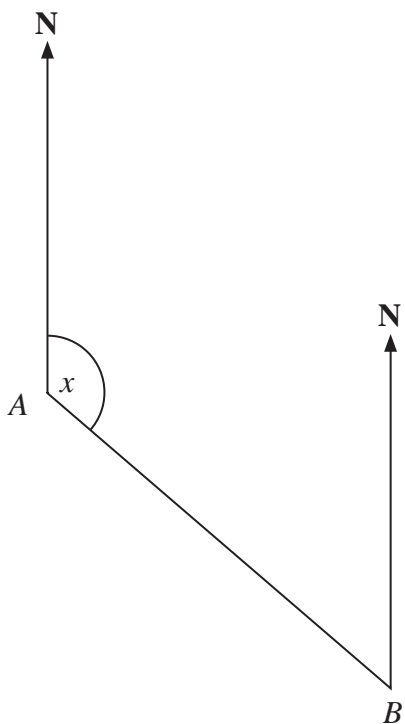
- (b) Find the bearing of the lighthouse from the boat.

.....
(1)

(Total 3 marks)



7. The diagram shows the position of two ports, *A* and *B*. A ship sails from port *A* to port *B*.



Scale: 1 cm represents 50 km

- (a) Measure the size of the angle marked *x*.

.....^o
(1)

- (b) Work out the real distance between port *A* and port *B*.
Use the scale 1 cm represents 50 km.

..... km
(2)

Port *C* is 350 km on a bearing of 060° from port *B*.

- (c) On the diagram, mark airport *C* with a cross (×).
Label it *C*.

(2)

(Total 5 marks)



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Mathematics A

Bounds

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

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Turn over ►



1. $w = \sqrt{\frac{x}{y}}$

$x = 5.43$ correct to 2 decimal places.

$y = 4.514$ correct to 3 decimal places.

By considering bounds, work out the value of w to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

$w =$

(Total 5 marks)



2. An arrow is shot vertically upwards at a speed of V metres per second.

The height, H metres, to which it rises is given by

$$H = \frac{V^2}{2g}$$

where $g \text{ m/s}^2$ is the acceleration due to gravity.

$V = 24.4$ correct to 3 significant figures.

$g = 9.8$ correct to 2 significant figures.

(i) Write down the upper bound of g .

.....

(ii) Calculate the lower bound of H .
Give your answer correct to 3 significant figures.

.....

(Total 3 marks)



3. A building plot is in the shape of a rectangle.

The width of the field is 26 metres, measured to the nearest metre.(a)

Work out the upper bound of the width of the field.

..... metres

(1)

The length of the field is 135 metres, measured to the nearest 5 metres.

(b) Work out the upper bound for the perimeter of the field.

..... metres

(3)

(Total 4 marks)



4. Sophie drove for 238 miles, correct to the nearest mile.
She used 26.3 litres of petrol, to the nearest tenth of a litre.

$$\text{Petrol consumption} = \frac{\text{Number of miles travelled}}{\text{Number of litres of petrol used}}$$

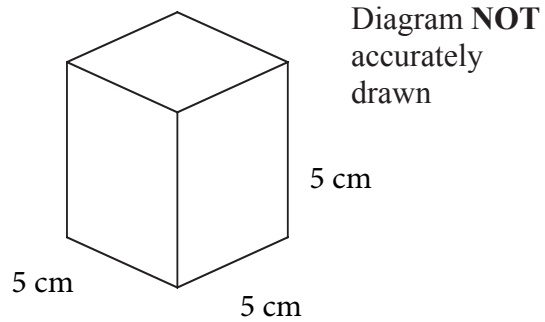
Work out the upper bound for the petrol consumption for Sophie's journey. Give your answer correct to 2 decimal places.

..... miles per litre

(Total 3 marks)



5. (a) A solid cube has sides of length 5 cm.



Work out the total surface area of the cube. State the units of your answer.

.....
(4)

(b) Change 125 cm^3 into mm^3 .

..... mm^3
(2)

The weight of the cube is 77 grams, correct to the nearest gram.

(c) (i) What is the minimum the weight could be?

..... grams

(ii) What is the maximum the weight could be?

..... grams



6. The length of a line is 53 centimetres, correct to the nearest centimetre.

(a) Write down the **least** possible length of the line.

..... centimetres
(1)

(b) Write down the **greatest** possible length of the line.

..... centimetres
(1)

(Total 2 marks)



7 . The voltage V of an electronic circuit is given by the formula

$$V = IR$$

where I is the current in amps
and R is the resistance in ohms.

Given that $V = 208$ correct to 3 significant figures,
 $R = 12.8$ correct to 3 significant figures,

calculate the lower bound of I .

..... Q7

(Total 3 marks)



8. The average fuel consumption (c) of Tara's car, in kilometres per litre, is given by the formula

$$c = \frac{d}{f}$$

where d is the distance travelled, in kilometres, and f is the fuel used, in litres.

$d = 153$ correct to 3 significant figures.

$f = 43.3$ correct to 3 significant figures.

By considering bounds, work out the value of c to a suitable degree of accuracy.
You must show **all** of your working **and** give a reason for your final answer.

$c = \dots\dots\dots$

(Total 5 marks)



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Mathematics A

Circle Theorems

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

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Turn over ►



1. $ABCD$ is a cyclic quadrilateral within a circle centre O .
 XY is the tangent to the circle at A .
Angle $XAB = 58^\circ$
Angle $BAD = 78^\circ$
Angle $DBC = 34^\circ$

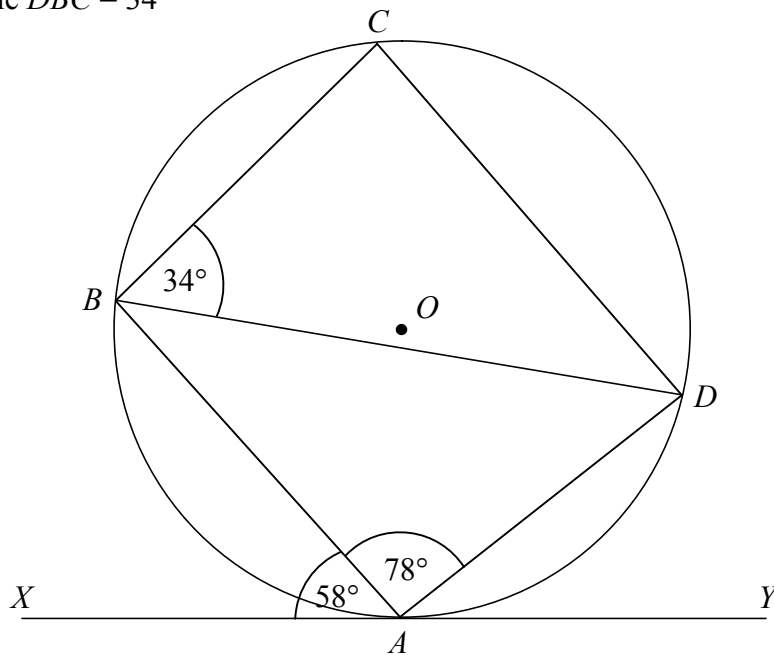


Diagram **NOT**
accurately drawn

Prove that AB is parallel to CD .

(Total 5 marks)



2.(a) Here is a circle with centre O .

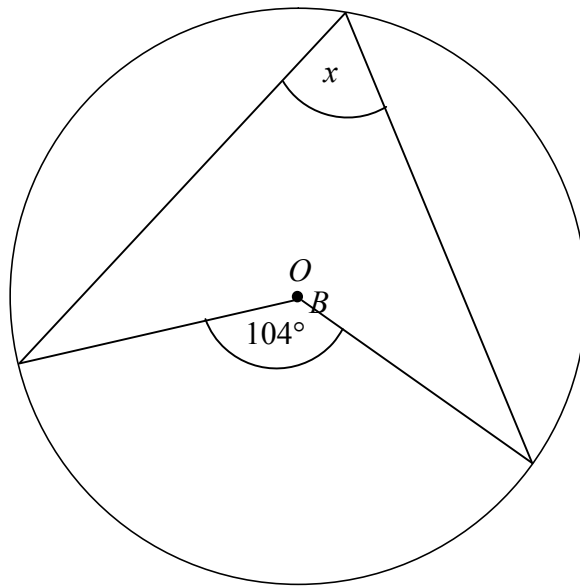


Diagram NOT accurately drawn

Write down the value of x .

..... degrees
(1)

(b) Here is a different circle.

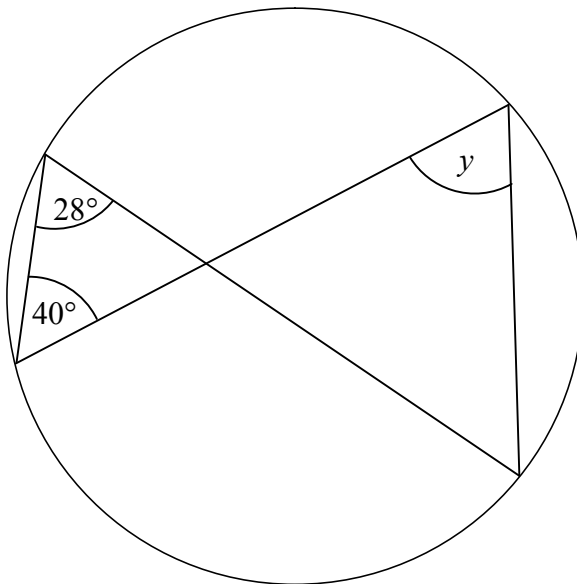


Diagram NOT accurately drawn

Write down the value of y .

..... degrees
(1)



3.

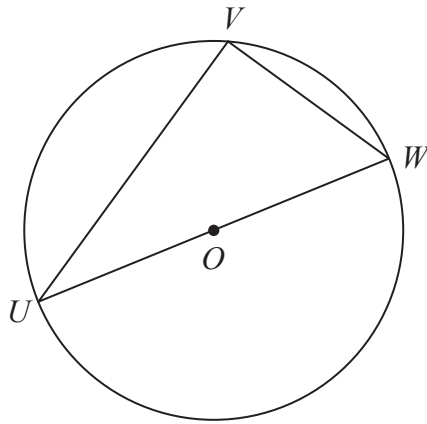


Diagram **NOT** accurately drawn

U , V and W are points on the circumference of a circle, centre O . UW is a diameter of the circle.

(a) (i) Write down the size of angle UVW .

°

.....

(ii) Give a reason for your answer.

.....

.....

(2)

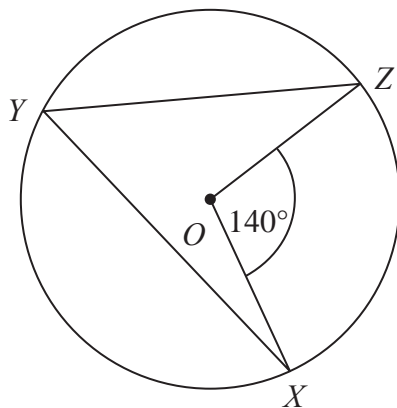


Diagram **NOT** accurately drawn

X , Y and Z are points on the circumference of a circle, centre O .
Angle $XOZ = 140^\circ$.

(b) (i) Work out the size of angle XYZ .

°

.....

(ii) Give a reason for your answer.

.....

.....

(2)



*4.

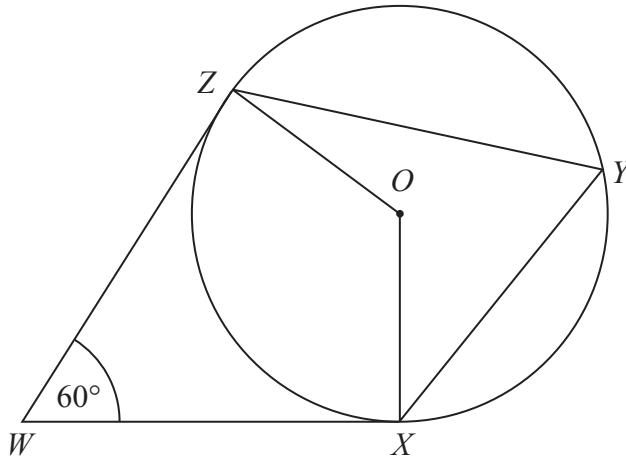


Diagram **NOT**
accurately drawn

X , Y and Z are points on the circumference of a circle, centre O .
 WX and WZ are tangents to the circle.

Angle $ZWX = 60^\circ$

Work out the size of angle XYZ .
Give a reason for each stage in your working.

(Total 4 marks)



5.

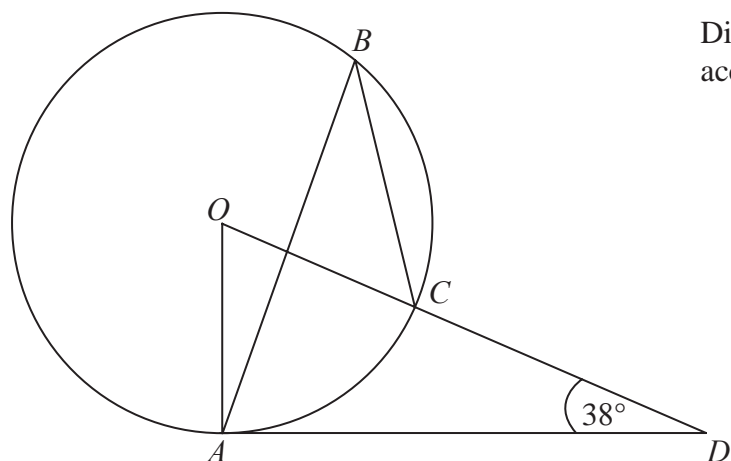


Diagram **NOT**
accurately drawn

The diagram shows a circle centre O .
 A , B and C are points on the circumference.

DCO is a straight line.
 DA is a tangent to the circle.

Angle $ADO = 38^\circ$

(a) Work out the size of angle AOD .

.....
(2)

(b) (i) Work out the size of angle ABC .

.....

(ii) Give a reason for your answer.

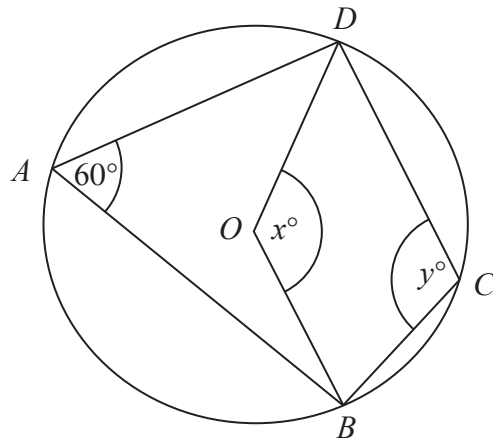
.....
(3)

(Total 5 marks)



6.

Diagram **NOT**
accurately drawn



In the diagram, A , B , C and D are points on the circumference of a circle, centre O .
Angle $BAD = 60^\circ$.

Angle $BOD = x^\circ$.

Angle $BCD = y^\circ$.

(a) (i) Work out the value of x .

$x = \dots\dots\dots$

(ii) Give a reason for your answer.

.....
.....

(2)

(b) (i) Work out the value of y .

$y = \dots\dots\dots$

(ii) Give a reason for your answer.

.....
.....

(2)

(Total 4 marks)



7.

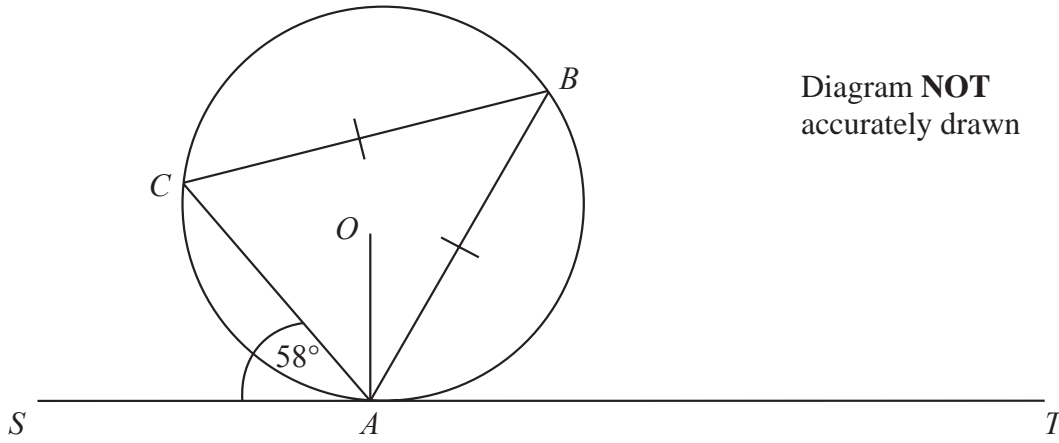


Diagram **NOT**
accurately drawn

A , B and C are points on the circumference of a circle, centre O .
The line SAT is the tangent at A to the circle.

$CB = AB$.
Angle $CAS = 58^\circ$.

Calculate the size of angle OAB .
Give a reason for each stage in your working.

.....
o

(Total 5 marks)



8.

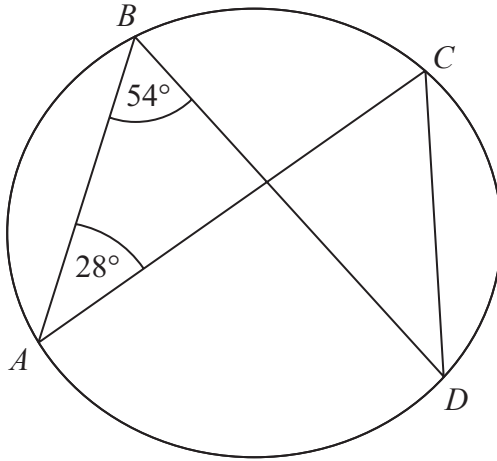


Diagram **NOT** accurately drawn

A, B, C and D are points on the circumference of a circle.
Angle $ABD = 54^\circ$.
Angle $BAC = 28^\circ$.

(i) Find the size of angle ACD .

.....^o

(ii) Give a reason for your answer.

.....
.....

(Total 2 marks)



9.

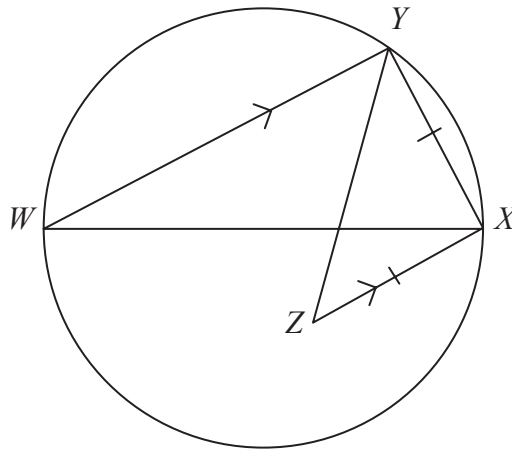


Diagram **NOT**
accurately drawn

WX is a diameter of a circle.

Y is a point on the circle.

Z is the point inside the circle such that $ZX = XY$ and XZ is parallel to YW .

Find the size of angle XZY .

You must give reasons for your answer.

.....^o Q9
(Total 4 marks)



10. $ABCD$ is a cyclic quadrilateral.
 AE is a tangent at A .
 CDE is a straight line.
Angle $CAD = 32^\circ$
Angle $ABD = 40^\circ$

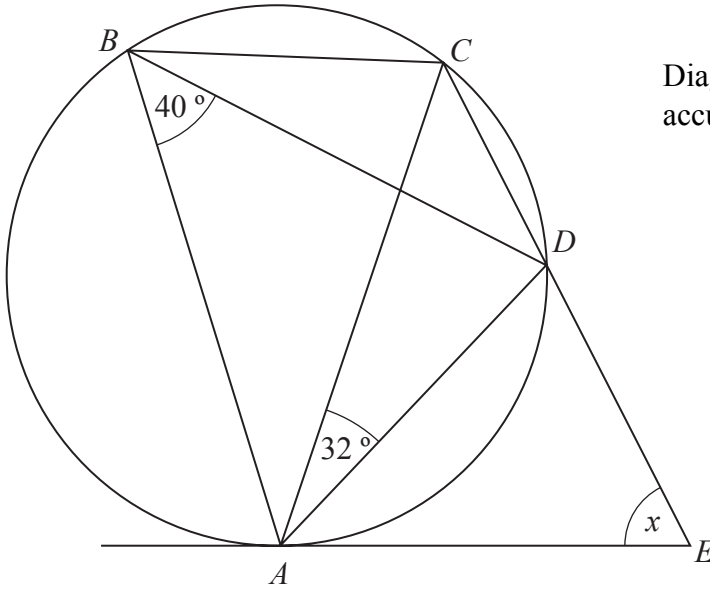


Diagram **NOT** accurately drawn

Work out the size of angle AED , marked x , on the diagram.
You **must** show your working.
Give reasons for any angles you work out.

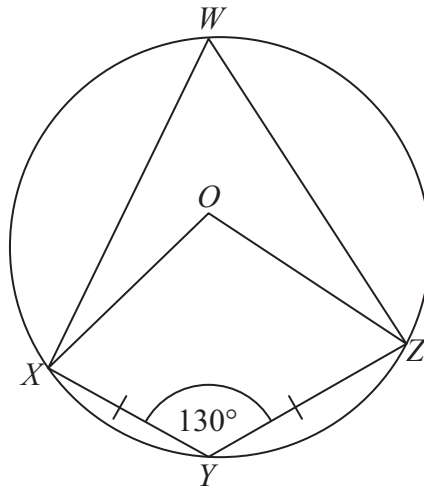
..... degrees

(Total 5 marks)



11.

Diagram **NOT**
accurately drawn



W, X, Y and Z are points on a circle, centre O .
 $XY = YZ$.
Angle $XYZ = 130^\circ$.

- (a) Write down the size of angle XWZ .
Give a reason for your answer.

.....
(2)

- (b) Work out the size of angle OZY .
Give reasons for your answer.

.....
(4)

(Total 6 marks)



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Mathematics A

Cumulative Frequency

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

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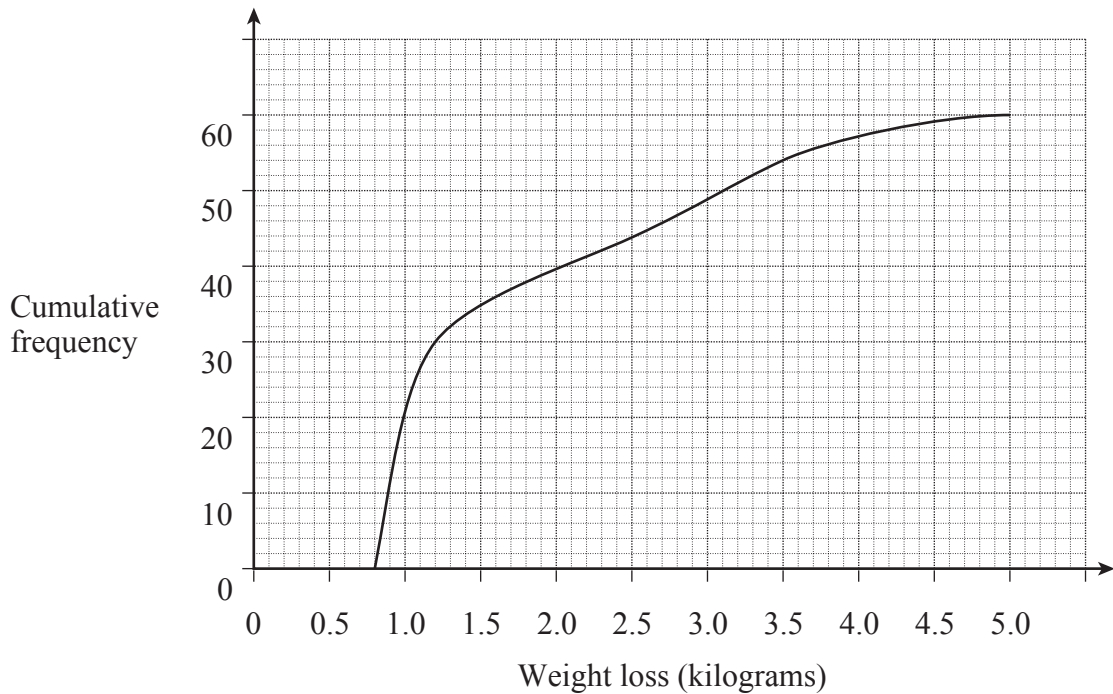
Turn over ►



1. Two groups of people are trying to lose weight.

(a) Group A join a gym.

The graph shows information about their weight loss after one month.



(i) How many people are in group A?

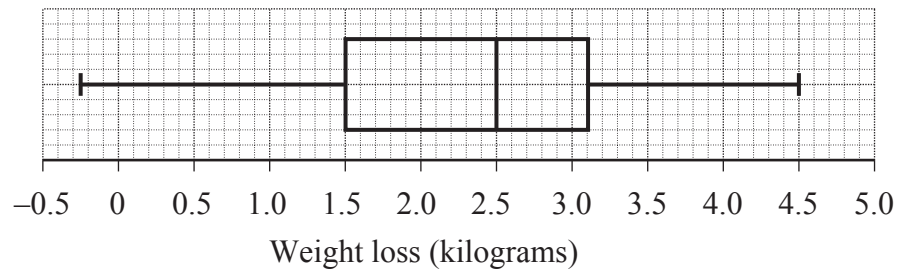
(1)

(ii) Does everyone in group A lose weight?
Write down how you decide.

(1)



- (b) Group B follow a diet.
The box plot shows information about their weight loss after one month



Does everyone in group B lose weight? Write down how you decide.

(1)

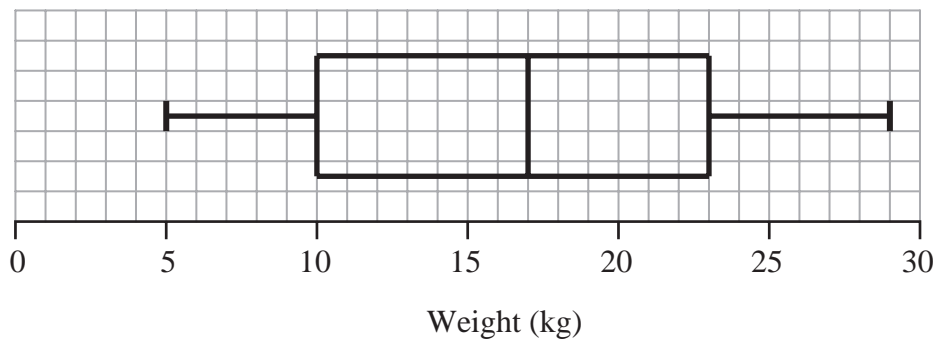
- (c) Compare the weight loss of group A with group B.

(5)

(Total 8 marks)



2. The box plot gives information about the distribution of the weights of bags on a plane.



- (a) Georgina says the lightest bag weighs 10 kg.

She is **wrong**.
Explain why.

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

- (b) Write down the median weight.

..... kg
(1)

- (c) Work out the interquartile range of the weights.

..... kg
(1)

There are 240 bags on the plane.

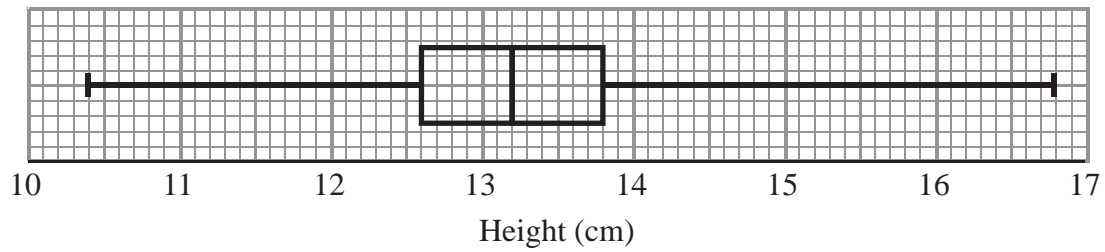
- (d) Work out the number of bags with a weight of 23 kg or more.

.....
(2)

(Total 5 marks)



3. David measured the height, in cm, of each tomato plant in his greenhouse.
He used the results to draw the box plot shown below.



- (a) Write down the median height.

.....cm
(1)

- (b) Work out the interquartile range.

.....cm
(2)

- (c) Explain why the interquartile range may be a better measure of spread than the range.

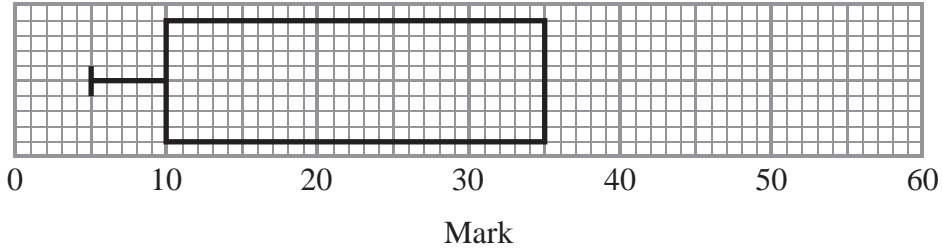
.....
.....

(1)

(Total 4 marks)



4. The incomplete box plot and table show some information about some marks.



	Mark
Lowest mark	5
Lower quartile	
Median	30
Upper quartile	35
Highest mark	55

(a) Use the information in the table to complete the box plot.

(2)

(b) Use the information in the box plot to complete the table.

(1)

(Total 3 marks)

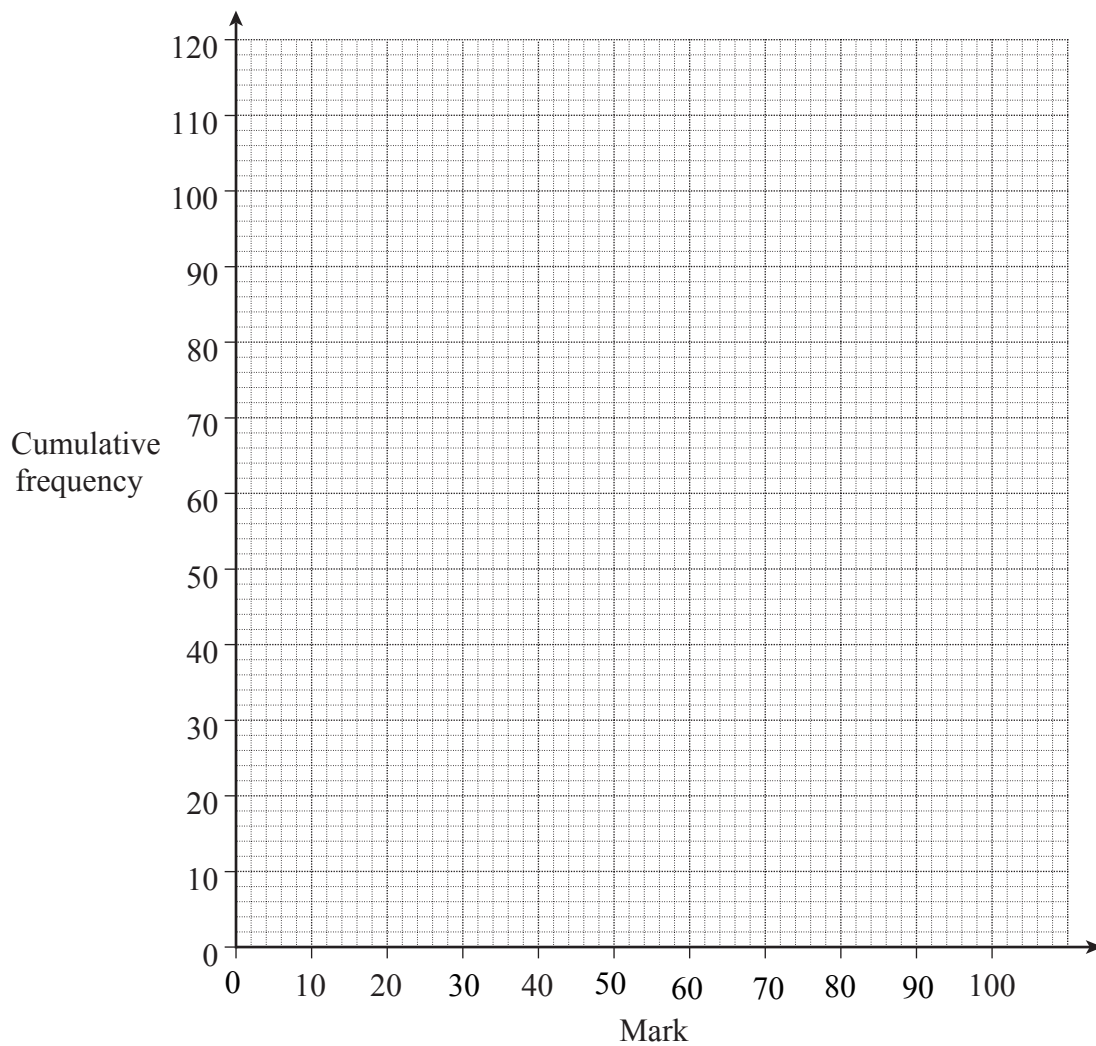


5. The table shows a summary of the marks scored by 120 people in a test.

Mark	Frequency
$0 < \text{mark} \leq 20$	8
$20 < \text{mark} \leq 40$	12
$40 < \text{mark} \leq 60$	46
$60 < \text{mark} \leq 80$	35
$80 < \text{mark} \leq 100$	19

- (a) Three-quarters of the people pass the test.

Use a cumulative frequency graph to estimate the pass mark.



.....
(5)



(b) Here is the table again.

Mark	Frequency
$0 < \text{mark} \leq 20$	8
$20 < \text{mark} \leq 40$	12
$40 < \text{mark} \leq 60$	46
$60 < \text{mark} \leq 80$	35
$80 < \text{mark} \leq 100$	19

Two of these 120 people are chosen at random.

(i) Work out the probability that both scored **over** 60.

.....
(2)

(ii)

Work out the probability that one scored **over** 80 and the other scored 80 or **under**.

.....
(3)

(Total 10 marks)



6. Georgina did a survey about the amounts of money spent by 120 families during summer holidays.

The cumulative frequency table gives some information about the amounts of money spent by the 120 families.

Amount (£A) spent	Cumulative frequency
$0 \leq A < 100$	13
$0 \leq A < 150$	25
$0 \leq A < 200$	42
$0 \leq A < 250$	64
$0 \leq A < 300$	93
$0 \leq A < 350$	110
$0 \leq A < 400$	120

(a) On the grid, draw a cumulative frequency diagram. (2)

(b) Use your cumulative frequency diagram to estimate the median.

£

(2)

A survey of the amounts of money spent by 200 families during their Christmas holidays gave a median of £305

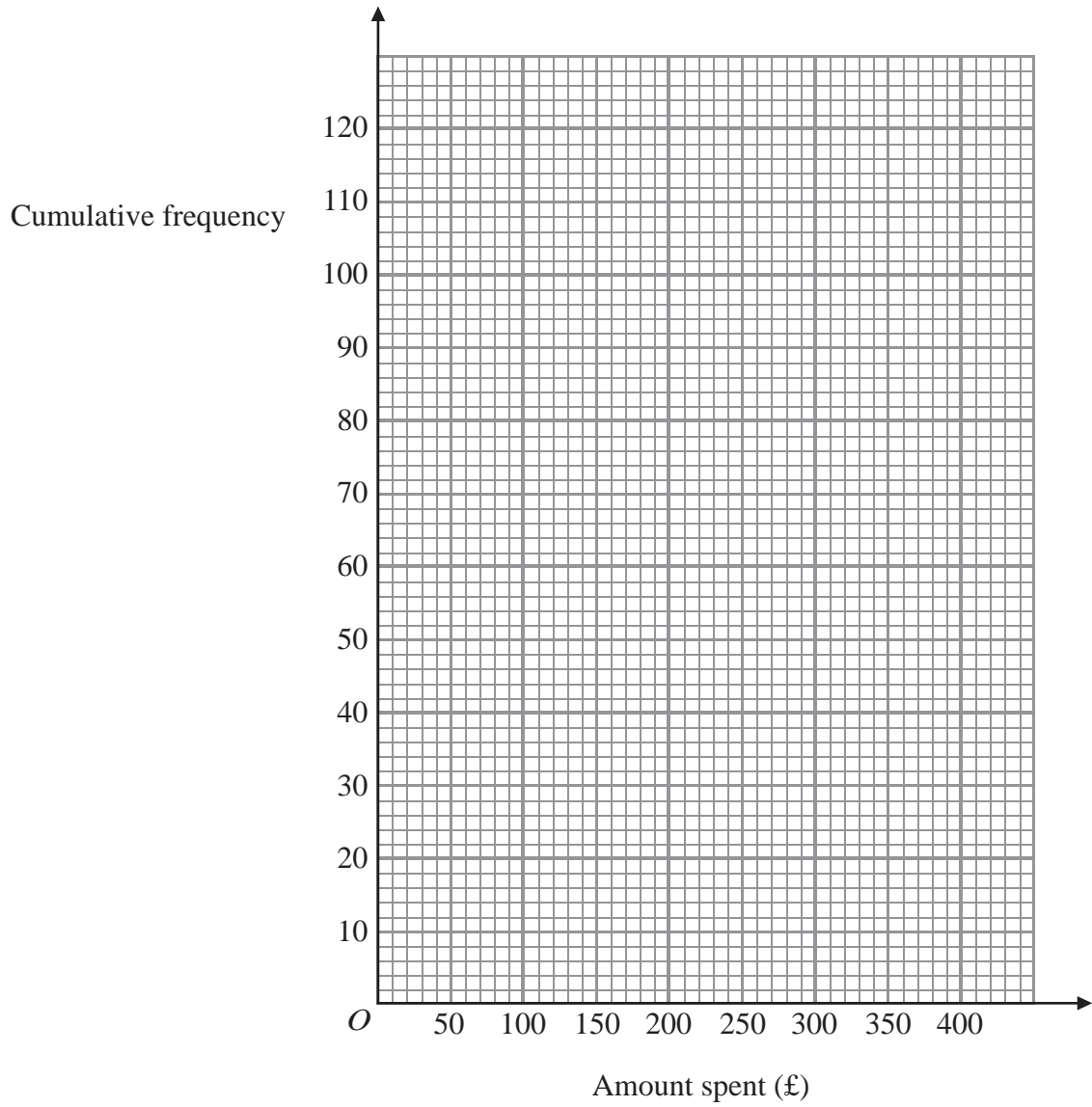
(c) Compare the amounts of money spent at Christmas with the amounts of money spent in summer.

.....

.....

(1)





(Total 5 marks)



7. The table shows information about the number of felt tip pens in 100 childrens pencil cases.

Number of pens	Frequency
$0 < n \leq 20$	18
$20 < n \leq 40$	22
$40 < n \leq 60$	35
$60 < n \leq 80$	15
$80 < n \leq 100$	8
$100 < n \leq 120$	2

(a) Complete the cumulative frequency table for this information.

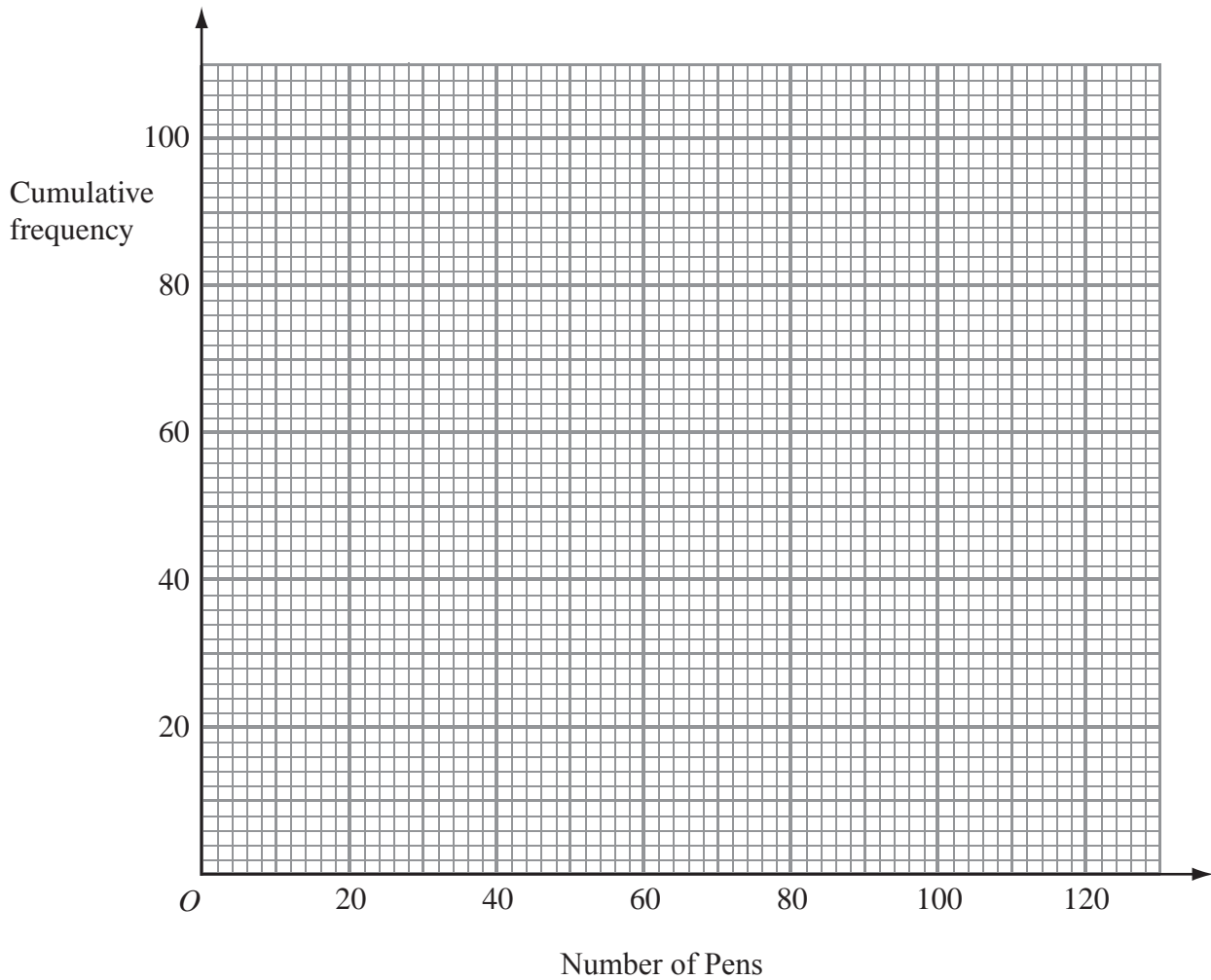
Number of pens	Cumulative frequency
$0 < n \leq 20$	18
$0 < n \leq 40$	
$0 < n \leq 60$	
$0 < n \leq 80$	
$0 < n \leq 100$	
$0 < n \leq 120$	

(1)

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

(2)





(c) Use your graph to find an estimate for the median number of pens.

.....
(1)

(Total 4 marks)



8. A company tested 100 batteries.

The table shows information about the number of hours that the batteries lasted.

Time (t hours)	Frequency
$50 \leq t < 55$	12
$55 \leq t < 60$	21
$60 \leq t < 65$	36
$65 \leq t < 70$	23
$70 \leq t < 75$	8

(a) Complete the cumulative frequency table for this information.

(1)

Time (t hours)	Cumulative frequency
$50 \leq t < 55$	12
$50 \leq t < 60$	
$50 \leq t < 65$	
$50 \leq t < 70$	
$50 \leq t < 75$	

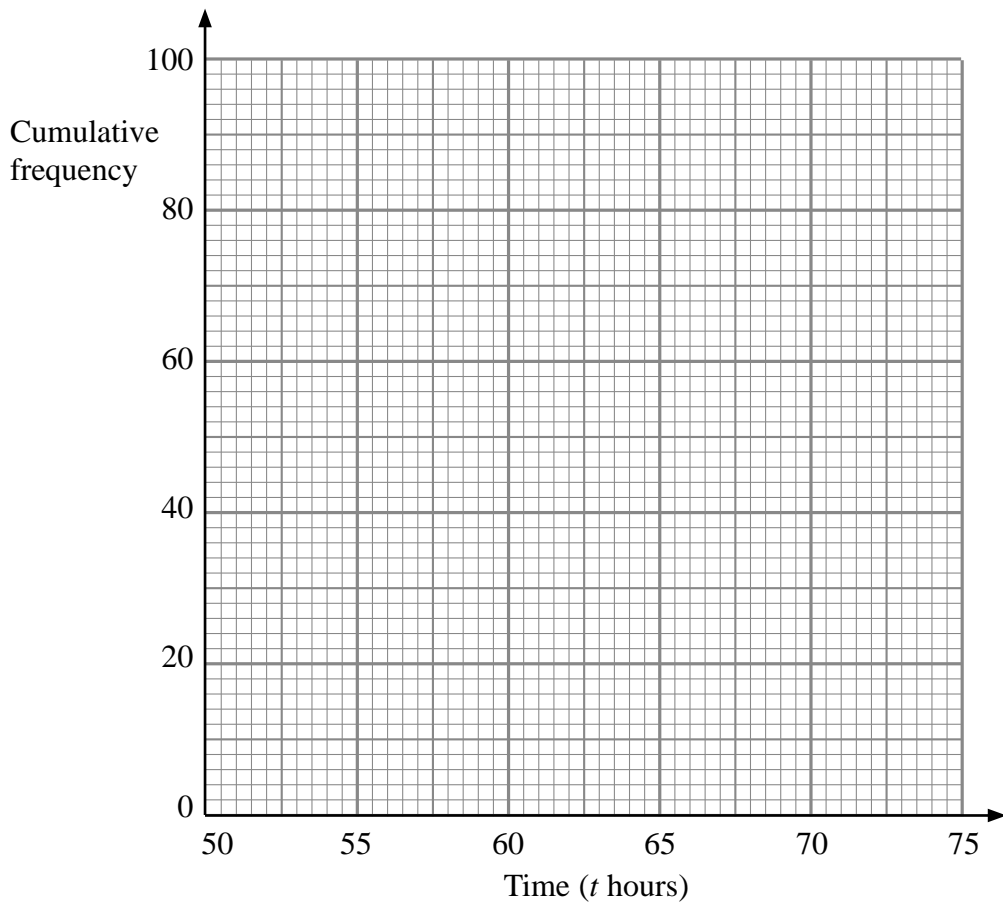
(b) On the grid, draw a cumulative frequency graph for your completed table.

(2)

(c) Use your completed graph to find an estimate for the median time.
You must state the units of your answer.

.....
(2)





(Total 5 marks)



9. The table gives some information about the number of fish caught in a match.

Number of fish	Frequency
$0 < n \leq 20$	16
$20 < n \leq 30$	26
$30 < n \leq 40$	23
$40 < n \leq 50$	10
$50 < n \leq 60$	5

(a) Write down the modal class interval.

.....
(1)

(b) Complete the cumulative frequency table.

Number of fish	Cumulative Frequency
$0 < n \leq 20$	
$0 < n \leq 30$	
$0 < n \leq 40$	
$0 < n \leq 50$	
$0 < n \leq 60$	

(1)

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

(2)

(d) Use your graph to find an estimate for

(i) the median number of fish,

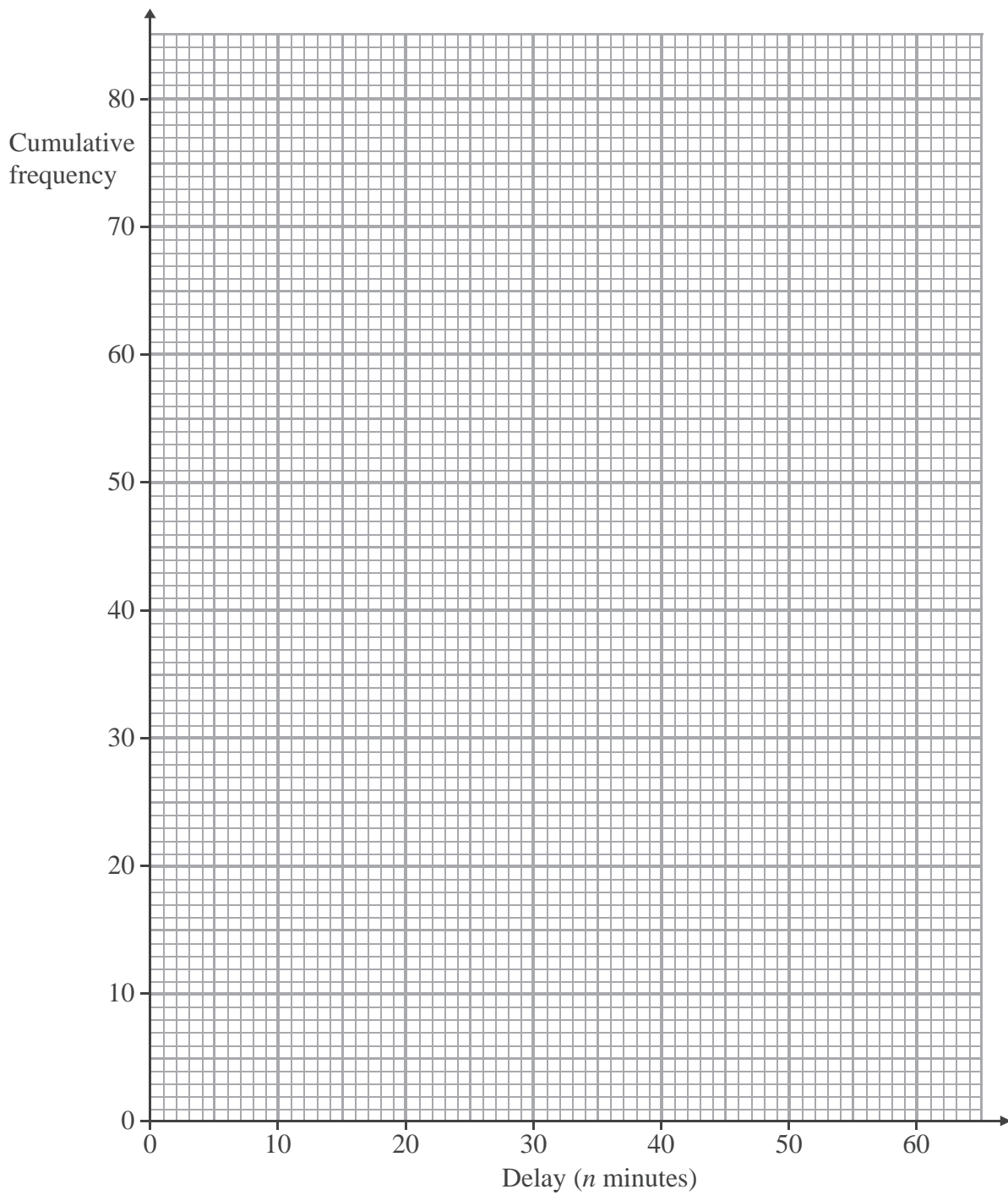
..... minutes

(ii) the interquartile range of the number of fish.

..... minutes

(3)

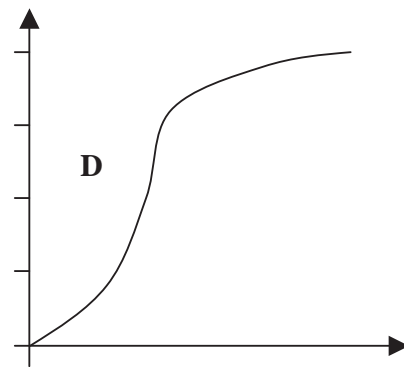
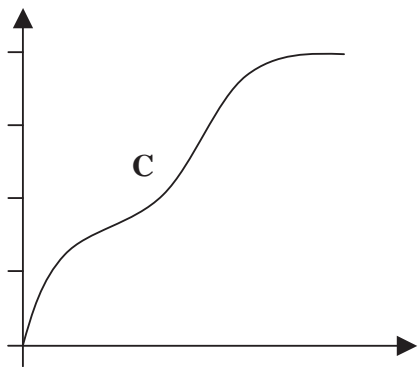
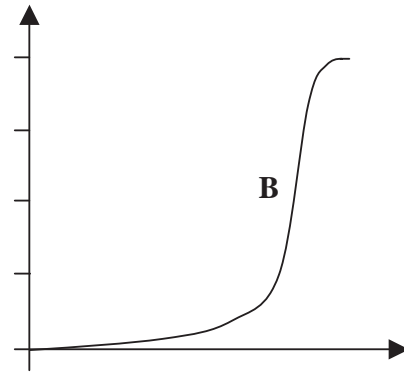
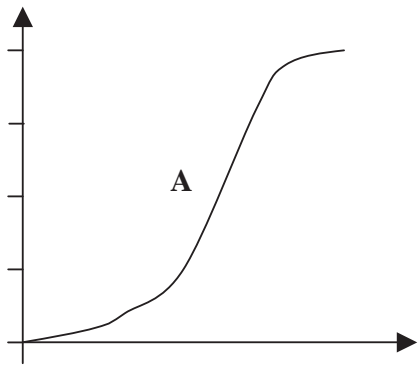




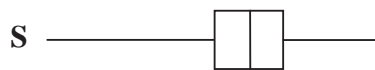
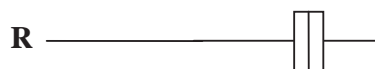
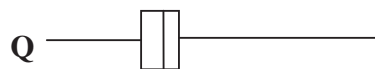
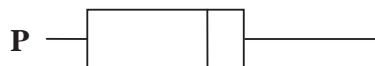
(Total 7 marks)



10. Here are four cumulative frequency diagrams.



Here are four box plots.



For each box plot, write down the letter of the appropriate cumulative frequency diagram.

P and

Q and

R and

S and

(Total 2 marks)



11. The table shows information about the time, m millimetres 120 tomato plants grow in a week.

Time (m millimetres)	Frequency
$70 < m \leq 80$	4
$80 < m \leq 90$	12
$90 < m \leq 100$	34
$100 < m \leq 110$	32
$110 < m \leq 120$	26
$120 < m \leq 130$	12

(a) Write down the modal class interval.

.....
(1)

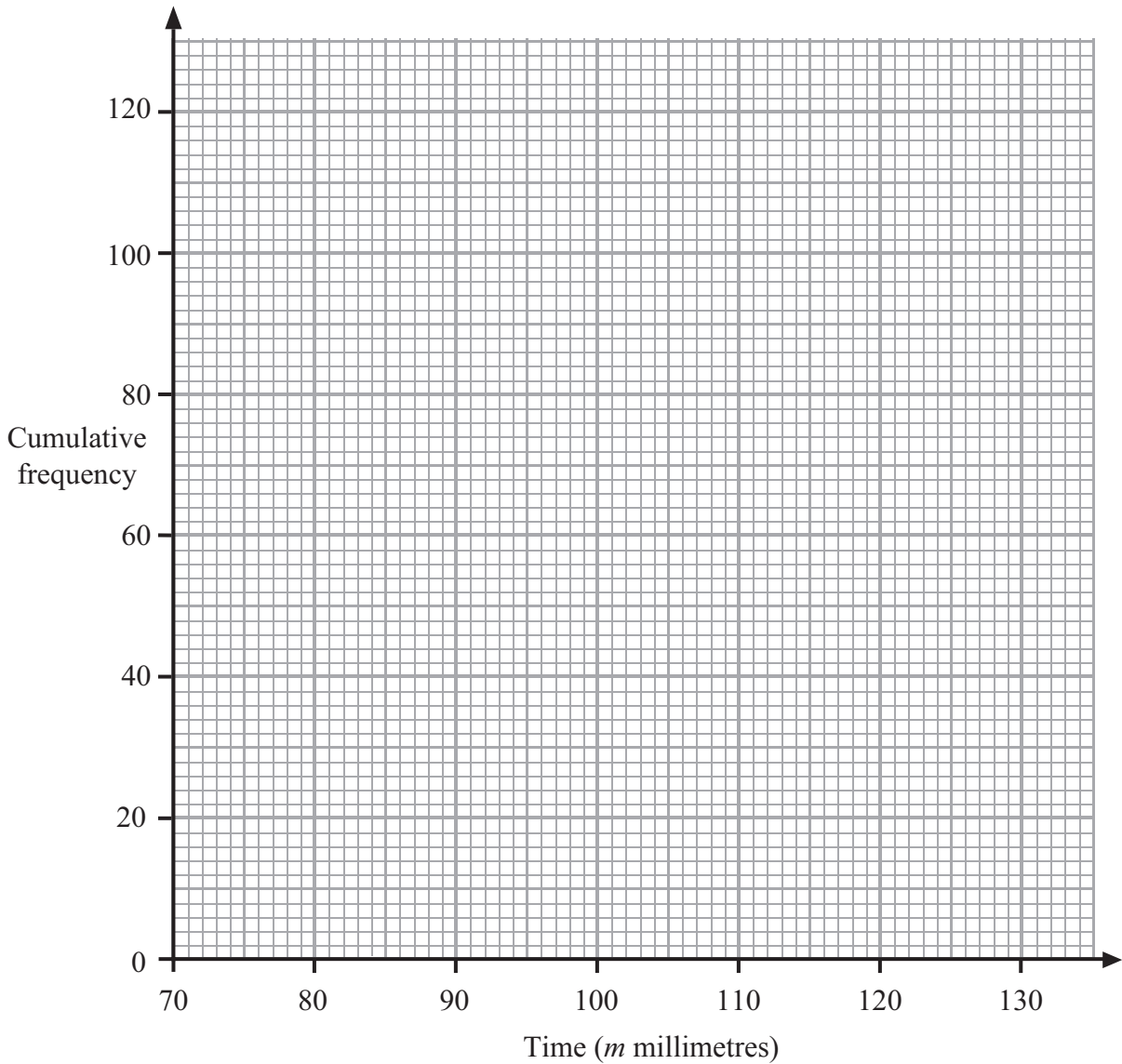
(b) Complete the cumulative frequency table.

Time (m millimetres)	Cumulative frequency
$70 < m \leq 80$	4
$70 < m \leq 90$	
$70 < m \leq 100$	
$70 < m \leq 110$	
$70 < m \leq 120$	
$70 < m \leq 130$	

(1)



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



(2)

(d) Use your graph to find an estimate for the median.

..... minutes

(1)

(Total 5 marks)



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Mathematics A

Fractions

Foundation Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/2F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
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- **Calculators may be used.**



Information

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Turn over ►



1. David earns a salary of £3500 per month.

He gets a pay rise of 4%.

Work out his new monthly salary.

.....

(3)



- 2(a)** Helen wins a race.
Her time is recorded as 50.36 seconds. Andrew comes second in the race.
His time is three-hundredths of a second slower.

Work out Andrew's time.

(2)

- (b)** Round Helen's time of 50.36 seconds to 1 decimal place.

(1)

(Total 6 marks)



3. Write a number in each box to make correct statements.

(a) $50\% = \frac{\square}{2}$

(1)

(b) $0.3 = \frac{\square}{10}$

(1)

(c) $\frac{1}{3} = \frac{\square}{9}$

(1)

(d) $\frac{3}{15} = \frac{\square}{5}$

(1)

Total 4 marks)



4. Two banks calculate the yearly interest they pay customers.

Westminster Bank

4% of the total that you invest

For example: Invest £700

Interest = 4% of £700

District Bank

1% of the first £300 that you invest 6% of amounts over £300 that you invest

For example: Invest £700 Interest = 1% of £300 + 6% of £400

Ashna has £500 to invest for one year.

Work out which bank will pay her more interest.

State how much **extra** interest she will earn.

Bank

Extra Interest £.....

(5)



5 There are 180 people at a wedding. 20% are children.
One-half are men. The rest are women.

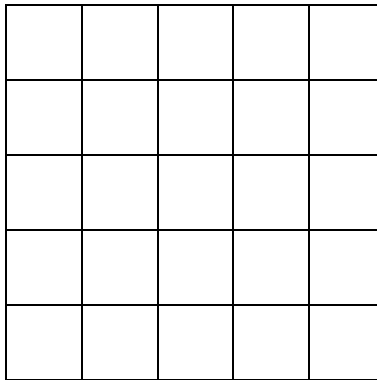
How many women are at the wedding?

Answer

(4)

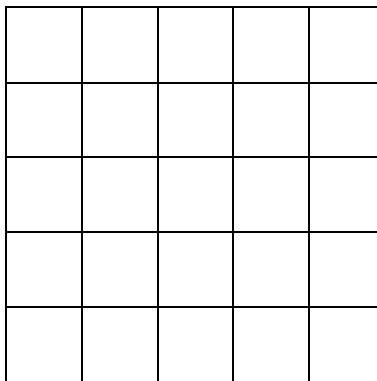


6 (a) Shade $\frac{9}{25}$ of this square grid.



(1)

(b) Shade $\frac{4}{5}$ of this square grid.



(1)

(c) Use your answers to part (a) and part (b) to write down the answer to

$$\frac{4}{5} - \frac{9}{25}$$

Answer

(1)

(d) Work out $\frac{2}{3}$ of 36

Answer.....

(2)



7. (a) Use your calculator to work out $\frac{4.7}{9.4-3.5}$

Write down all the figures on your calculator display.

.....
(2)

(b) Write these numbers in order of size.
Start with the smallest number.

0.82 $\frac{4}{5}$ 85% $\frac{2}{3}$ $\frac{7}{8}$

.....
(2)
(Total 4 marks)



9. A concert ticket costs £65 plus a booking charge of 15%.

Work out the total cost of a concert ticket.

£

(Total 3 marks)

10. A school canteen sells salads and hot meals.

In one week the number of salads sold and the number of hot meals sold were in the ratio 3 : 5

The total number of salads and hot meals sold in the week was 1456

Work out the number of salads sold.

.....

(Total 2 marks)



11. A garage sells British cars and foreign cars.

The ratio of the number of British cars sold to the number of foreign cars sold is $2 : 7$

The garage sells 45 cars in one week.

(a) Work out the number of British cars the garage sold that week.

.....
(2)

A car tyre costs £80 plus VAT at $17\frac{1}{2}\%$.

(b) Work out the total cost of the tyre.

£
(3)

The value of a new car is £14 000

The value of the car depreciates by 20% per year.

(c) Work out the value of the car after 2 years.

£
(3)



12. There are some pens in a bag.

36 of the pens are blue.

24 of the pens are black.

- (a) Write down the ratio of the number of blue pens to the number of black pens.
Give your ratio in its simplest form.

..... :
(2)

There are some books and comics in a box.

The total number of books and comics is 54

The ratio of the number of books to the number of comics is 1 : 5

- (b) Work out the number of books in the box.

.....
(2)

(Total 4 marks)



13. Louis invested £6500 for 2 years in a savings account.

He was paid 4% per annum compound interest.

(a) How much did Louis have in his savings account after 2 years?

£
(3)

Hassan invested £2400 for n years in a savings account.

He was paid 7.5% per annum compound interest.

At the end of the n years he had £3445.51 in the savings account.

(b) Work out the value of n .

.....
(2)

(Total 5 marks)



14. (a) Work out $\frac{2}{3} \div \frac{7}{9}$

Give your fraction in its simplest form.

.....
(3)

(b) Work out $2\frac{1}{3} - 1\frac{2}{5}$

.....
(3)

(Total 6 marks)



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Write your name here

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Other names

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Candidate Number

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Mathematics A

Frequency

Foundation Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/2F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

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Turn over ►



1 (a) Basil records the types of fish that he caught during his holiday in The Bahamas.

(i) Complete the table.

Type of fish	Tally	Frequency
Mutton Fish	IIII	
Grouper	III	
Jack	HHH HHI II	
Schoolmaster	HHH IIII	
	Total	

(3)

(ii) What fraction of the fish are Mutton Fish?
Give your answer in its simplest form.



(2)

(b) This table shows the types of fish that Peter caught during the holiday.

Type of fish	Mutton Fish	Grouper	Jack	Schoolmaster
Frequency	4	6	5	3

She has finished the first row of a pictogram to show the results. Complete the key and pictogram.

Key:  represents fish

Mutton Fish	 
Grouper	
Jack	
Schoolmaster	

(4)



- (c) 500 000 people record the types of birds in their gardens. In total, they record eight million birds. On average, how many birds does each person record?

.....
(3)

- (d) Here is a list of the birds at a bird table.

robin robin sparrow blackbird starling
blackbird starling blackbird robin blackbird

One bird flies away. Another bird arrives at the bird table. The new mode is robin.

What type of bird flies away and what type of bird arrives? Complete the table.

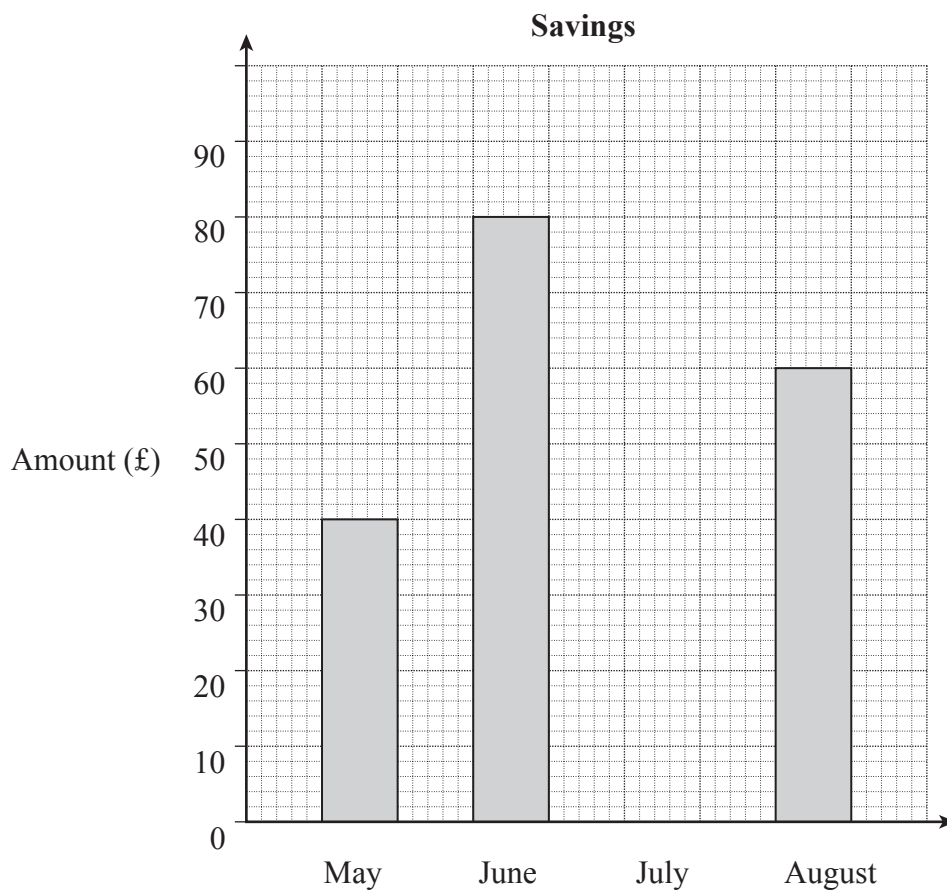
Type of bird	
Flies away	
Arrives	

(2)

(Total 14 marks)



2 (a) The bar chart shows the amounts Isaac saves in May, June and August 2010.



(i) How much does he save in May 2010? £

(1)

(ii) From May to August he saves £250 in total.
Complete the bar chart by drawing the bar for July.

(3)



(b) The pictogram shows the amounts Isaac saves in the next four months.

Key: represents £20

September	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
October	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/>	
November	<input type="text"/> <input type="text"/>	<input type="text"/>		
December	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	<input type="text"/>

Work out the range of the amount he saves in these four months. You **must** show your working.

£

(2)

(c) (i) For the next 4 months he saves £50 each month.

How much has he saved in total?

£

(3)

(ii) Isaac spends 50% of these total savings to pay for a holiday.

How much does he pay for the holiday?

.....

.....

£

(2)

(Total 11 marks)



3. Is money discrete or continuous? Tick a box.

Discrete

Continuous

Give a reason for your answer.

(1)

Peter sells revision guides on a website. The sales in May are shown.

Sales (£)	Frequency
8	10
10	18
12	7
15	4
20	1

(a) Calculate his mean price.

£

(3)

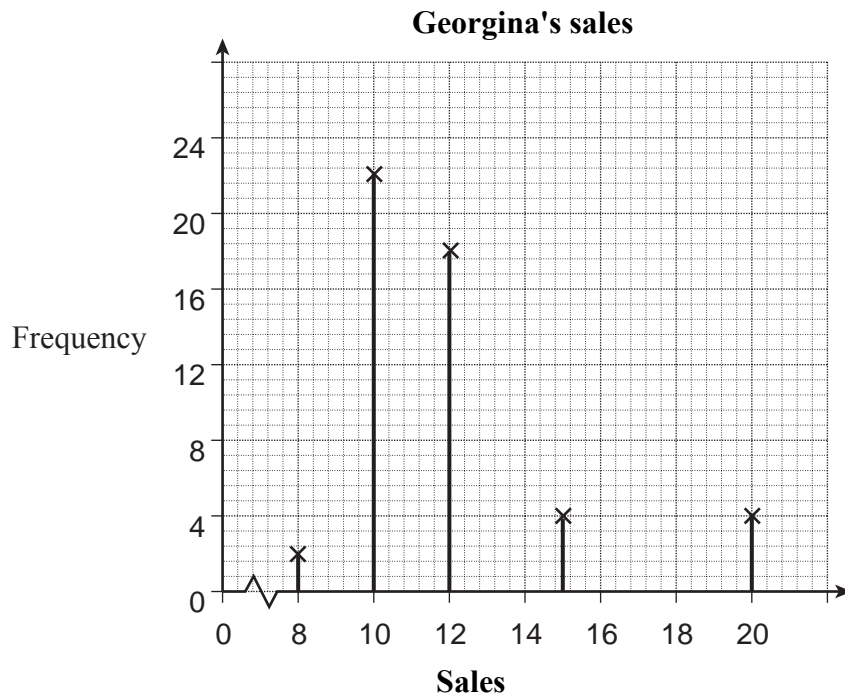
(b) Peter says that his modal price and his median price are both £10. Is he correct?

Give reasons and working to show how you decide.

(2)



(c) Georgina also sells revision guides on a website



Give **one** similarity and **one** difference in the sales of Peter and Georgina.

Similarity

.....

Difference

.....

(2)

(Total 10 marks)



4. Kelsi rolled a dice 10 times.

Here are her scores.

1 5 6 4 4 2 2 3 4 3

(a) Find the mode.

.....
(1)

(b) Work out the mean.

.....
(2)

(c) Work out the range.

.....
(2)

(Total 5 marks)



5. Here is a list of the fruit 25 people liked best.

cherries strawberries cherries raspberries raspberries strawberries plums
rasberries cherries strawberries plums raspberries raspberries
rasberries cherries cherries plums strawberries strawberries
plums raspberries strawberries strawberries plums strawberries

(a) Complete the table for the information in the list.

Fruit	Tally	Frequency
cherries		
plums		
rasberries		
strawberries		

(2)

(b) Draw a suitable diagram to show this information in the table.
Use the space below.



6.

	Male	Female
First year	397	608
Second year	250	210

The table gives information about the numbers of students in the two years of a college course.

Hanna wants to interview some of these students.

She takes a random sample of 50 students stratified by year and by gender.

Work out the number of students in the sample who are male and in the first year.

.....
(Total 3 marks)



7. Tara carried out a survey of the number of school dinners 34 students had in one week.

The table shows this information.

Number of school dinners	Frequency	
0	0	
1	8	
2	12	
3	7	
4	5	
5	2	

Calculate the mean.

.....

(Total 3 marks)



8. Sophie asked 32 women about the number of children they each had.

The table shows information about her results.

Number of children	Frequency	
0	9	
1	6	
2	7	
3	8	
4	2	
more than 4	0	

(a) Find the mode.

.....
(1)

(b) Calculate the mean.

.....
(3)

(Total 4 marks)



9. The table shows some information about the ages, in years, of 60 people.

Age (in years)	Frequency
0 to 9	6
10 to 19	13
20 to 29	12
30 to 39	9
40 to 49	7
50 to 59	4
60 to 69	9

(a) Write down the modal class.

.....
(1)

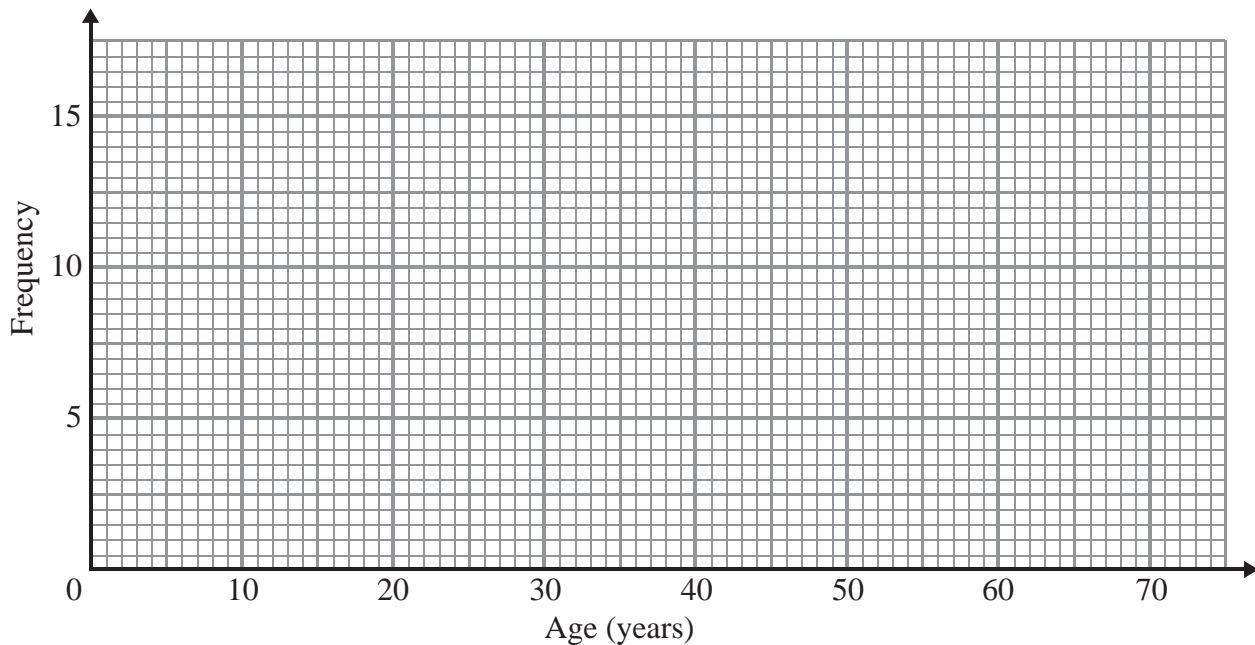
David says

‘The median lies in the class 30 to 39’

David is wrong.

(b) Explain why.

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



(c) On the grid, draw a frequency polygon for the information in the table.

(2)



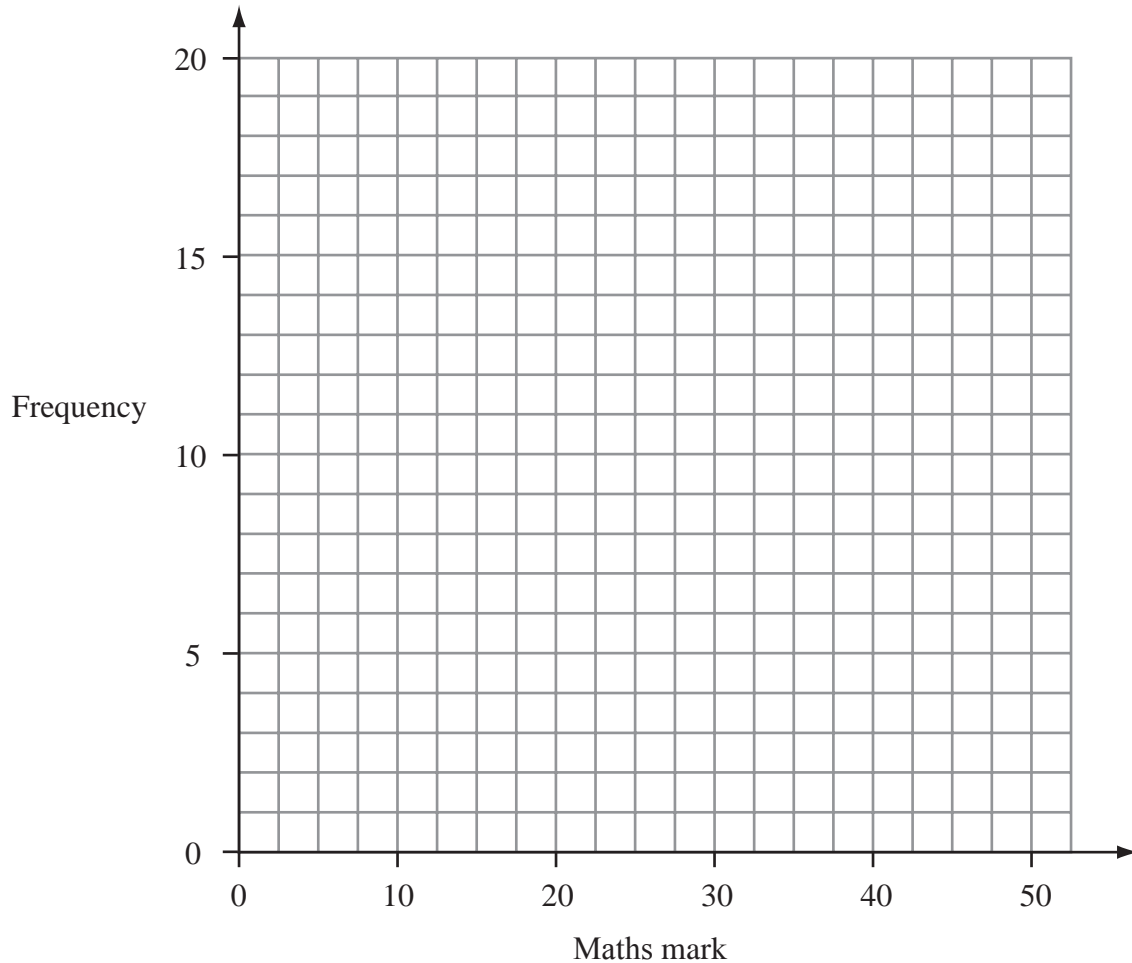
10. 60 students take a maths test.

The test is marked out of 50.

This table shows information about the students' marks.

Maths mark	0–10	11–20	21–30	31–40	41–50
Frequency	5	13	17	19	6

On the grid, draw a frequency polygon to show this information.



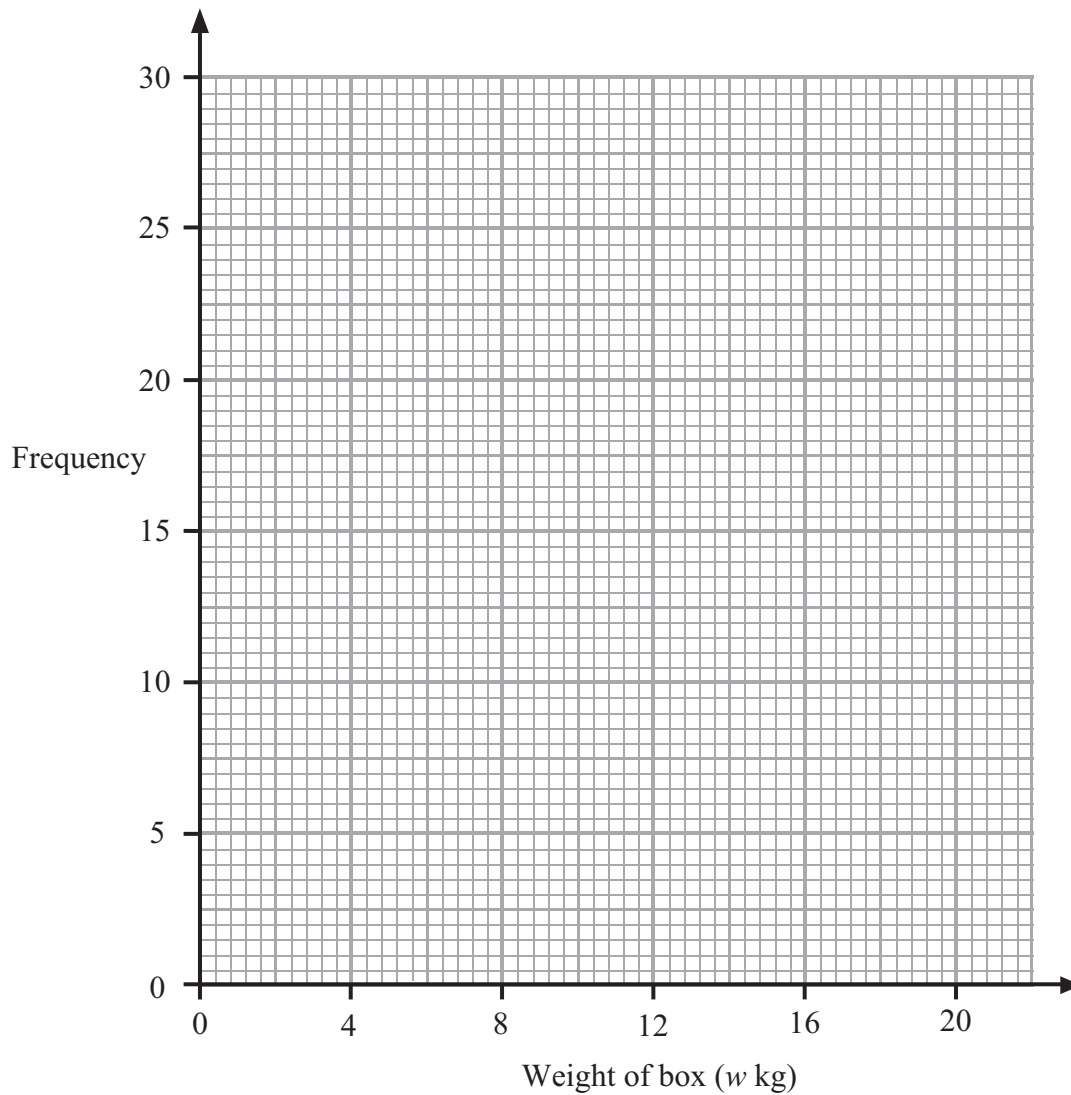
(Total 2 marks)



11. The table shows some information about the weights, in kg, of 100 boxes.

Weight of box (w kg)	Frequency
$0 < w \leq 4$	11
$4 < w \leq 8$	16
$8 < w \leq 12$	29
$12 < w \leq 16$	26
$16 < w \leq 20$	20

Draw a frequency polygon to show this information.



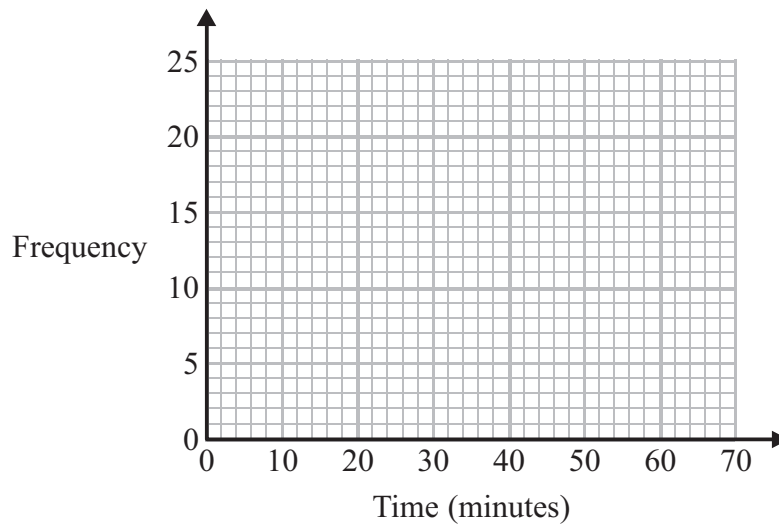
(Total 2 marks)



12. The frequency table gives information about the times it took some children to get to school one day.

Time (t minutes)	Frequency
$0 < t \leq 10$	4
$10 < t \leq 20$	8
$20 < t \leq 30$	14
$30 < t \leq 40$	16
$40 < t \leq 50$	6
$50 < t \leq 60$	2

- (a) Draw a frequency polygon for this information.



(2)

- (b) Write down the modal class interval.

.....
(1)

One of the children is chosen at random.

- (c) Work out the probability that this child took more than 40 minutes to get to school.

.....
(2)

(Total 5 marks)



Write your name here

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Mathematics A

Histograms

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

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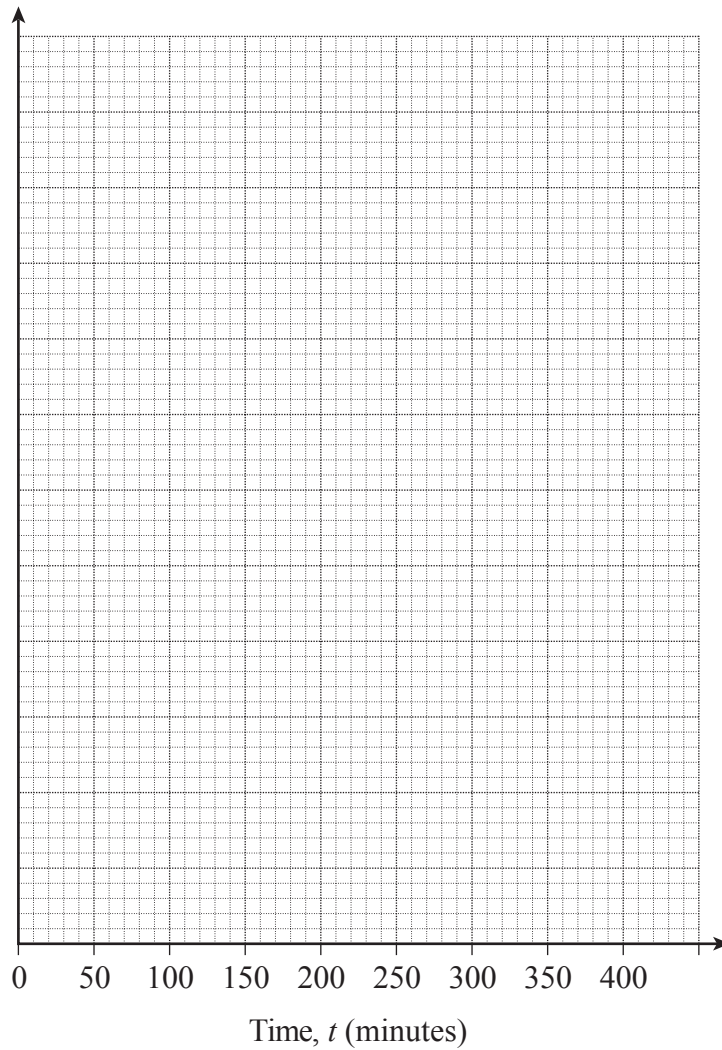
Turn over ►



1. The table shows information about the length of time that 180 people spend gardening.

Time, t (minutes)	Frequency
$60 < t \leq 150$	18
$150 < t \leq 180$	66
$180 < t \leq 240$	60
$240 < t \leq 360$	36

- (a) Draw a suitable frequency diagram for the data.



(3)



(b) Calculate an estimate of the average length of time for those people who are gardening for over three hours.

..... minutes

(2)

(c) Two people are chosen at random from the 180 people.

Estimate the probability that both are gardening for less than two hours.

.....

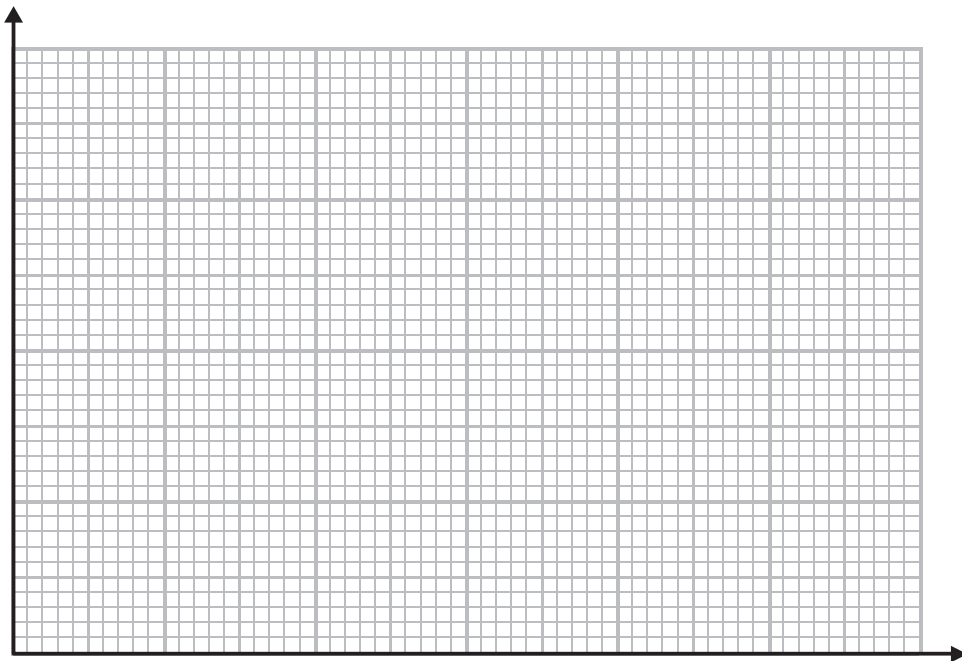
(3)



2. The table gives information about the heights, h centimetres, of plants in a greenhouse.

Height (h centimetres)	Frequency
$0 < h \leq 2$	7
$2 < h \leq 4$	14
$4 < h \leq 8$	16
$8 < h \leq 16$	22
$16 < h \leq 20$	12

Draw a histogram to show this information.



(Total 3 marks)

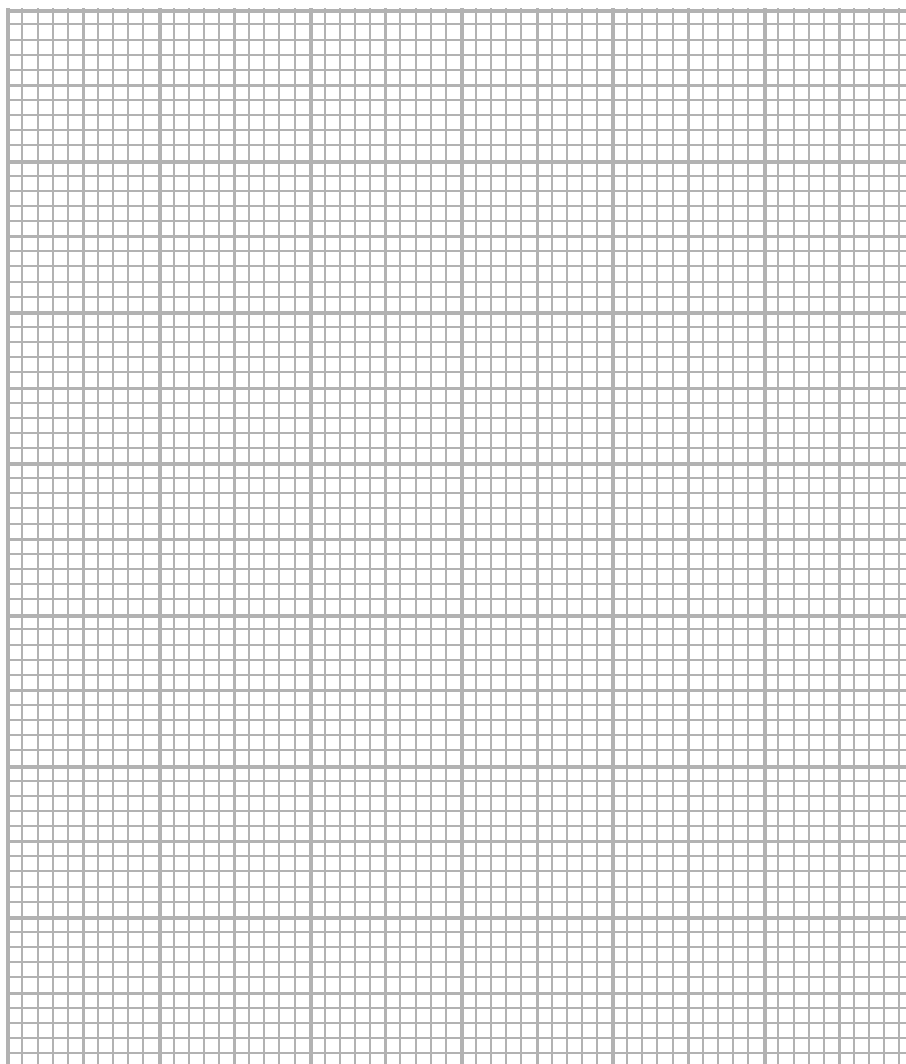


3. The table gives information about the ages of the population of a city.

Age (a years)	Number (thousands)
$0 \leq a < 10$	9
$10 \leq a < 20$	8
$20 \leq a < 35$	10
$35 \leq a < 50$	19
$50 \leq a < 55$	4
$55 \leq a < 65$	7
$65 \leq a < 80$	4
$80 \leq a < 100$	1

(a) On the graph paper below, using a scale of 1 cm to represent 10 years on the Age axis, draw a histogram to represent this information.

(4)



(b) Write down the class interval in which the median lies. (1)

(c) Calculate, giving your answer in years and months, an estimate of the mean age of the population. (4)

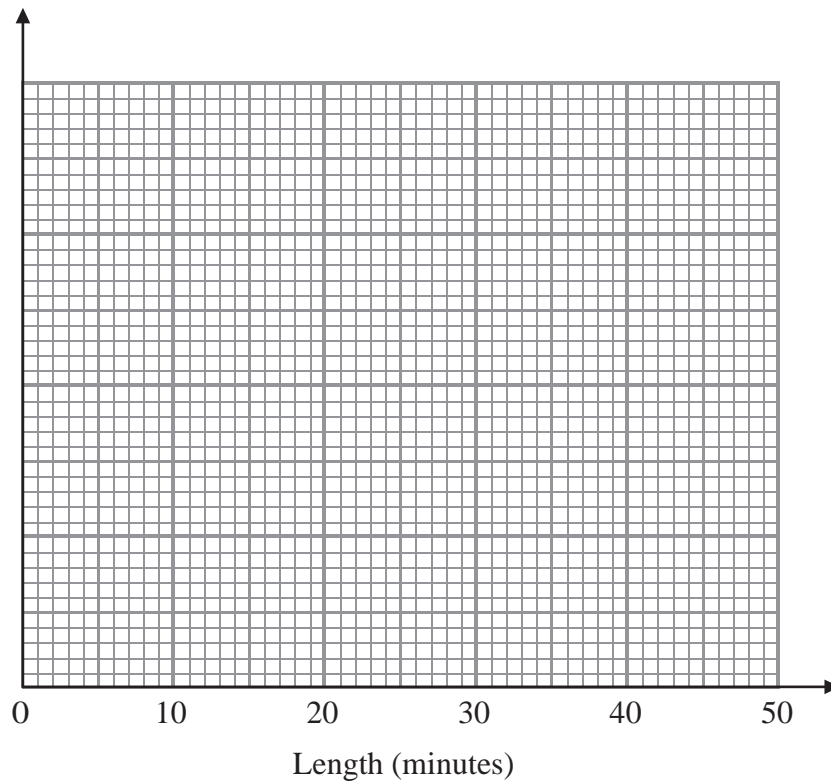


4. A pub has 64 customers one evening.

The table gives information about the lengths, in minutes, of the time the customers stayed for.

Length (x) minutes	Frequency
$0 < x \leq 5$	1
$5 < x \leq 15$	10
$15 < x \leq 30$	17
$30 < x \leq 40$	21
$40 < x \leq 45$	15

Draw a histogram for this information.



(Total 4 marks)



5. The incomplete histogram and table show information about the weights of some vehicles.

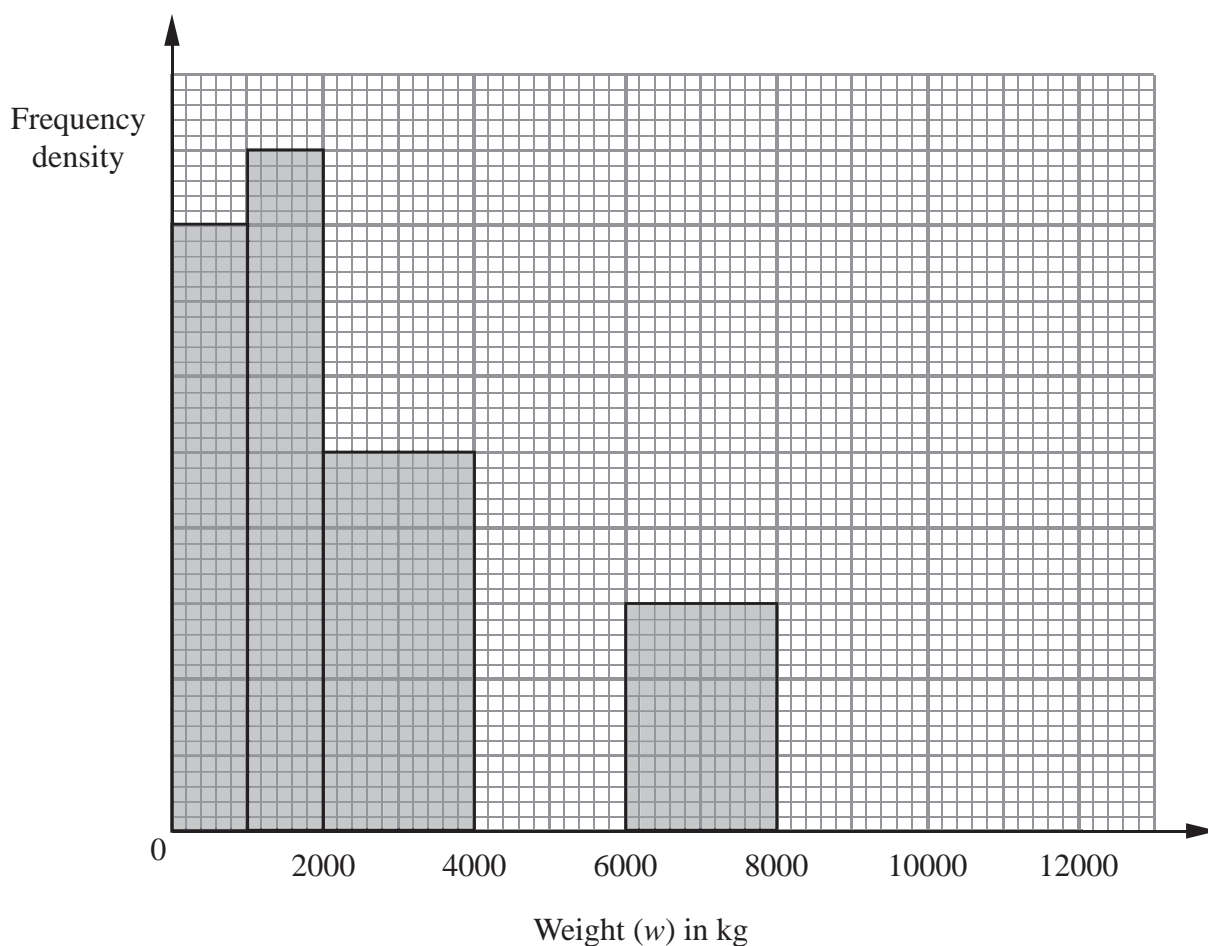
Weight (w) in kg	Frequency
$0 < w \leq 1000$	16
$1000 < w \leq 2000$	
$2000 < w \leq 4000$	
$4000 < w \leq 6000$	14
$6000 < w \leq 8000$	
$8000 < w \leq 12000$	4

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

(2)

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

(2)



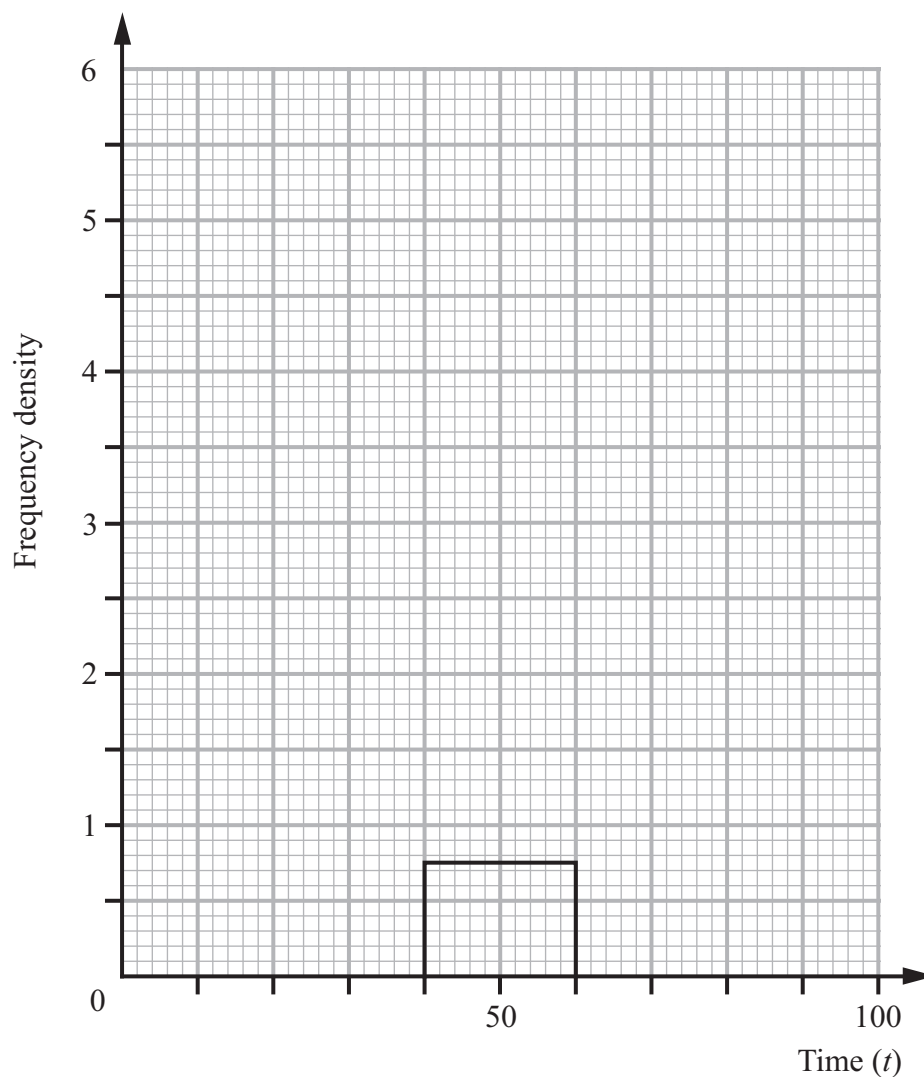
(Total 4 marks)



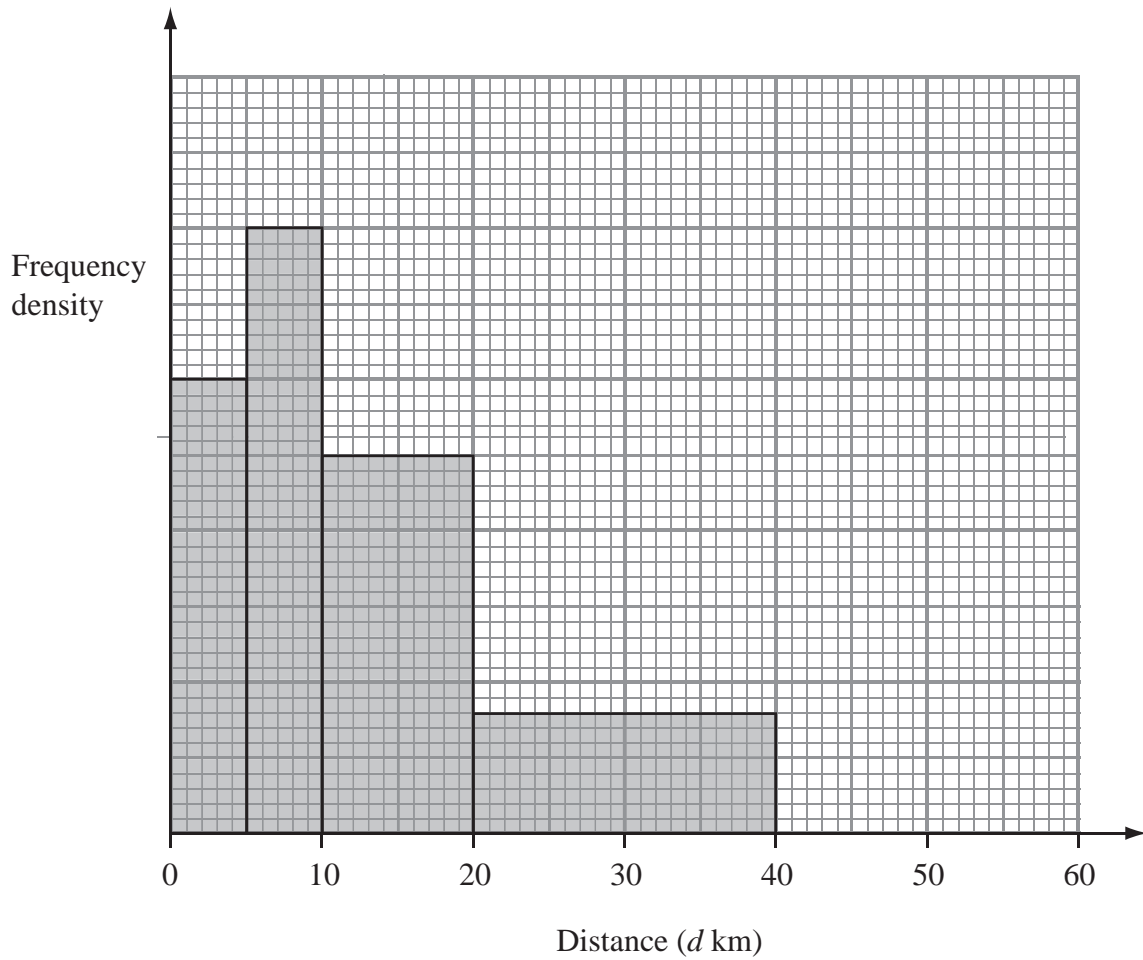
6. One hundred hikers went for a walk. The times taken by the hikers to complete the walk are summarised in the table.

Time (t)	Number of hikers
$0 \leq t < 25$	15
$25 \leq t < 35$	11
$35 \leq t < 40$	27
$40 \leq t < 60$	15
$60 \leq t < 90$	15
$90 \leq t < 100$	12

- (a) Use the information given in the table to calculate an estimate for the mean time taken, to one decimal place. (3)
- (b) Given that the frequency density for the $40 \leq t < 60$ time interval is 0.75, complete the histogram to represent this information on the graph paper.



7. The incomplete histogram and table give some information about the distances some cyclists travel each day.



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

Distance (d km)	Frequency
$0 < d \leq 5$	15
$5 < d \leq 10$	20
$10 < d \leq 20$	
$20 < d \leq 40$	
$40 < d \leq 60$	15

(2)

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

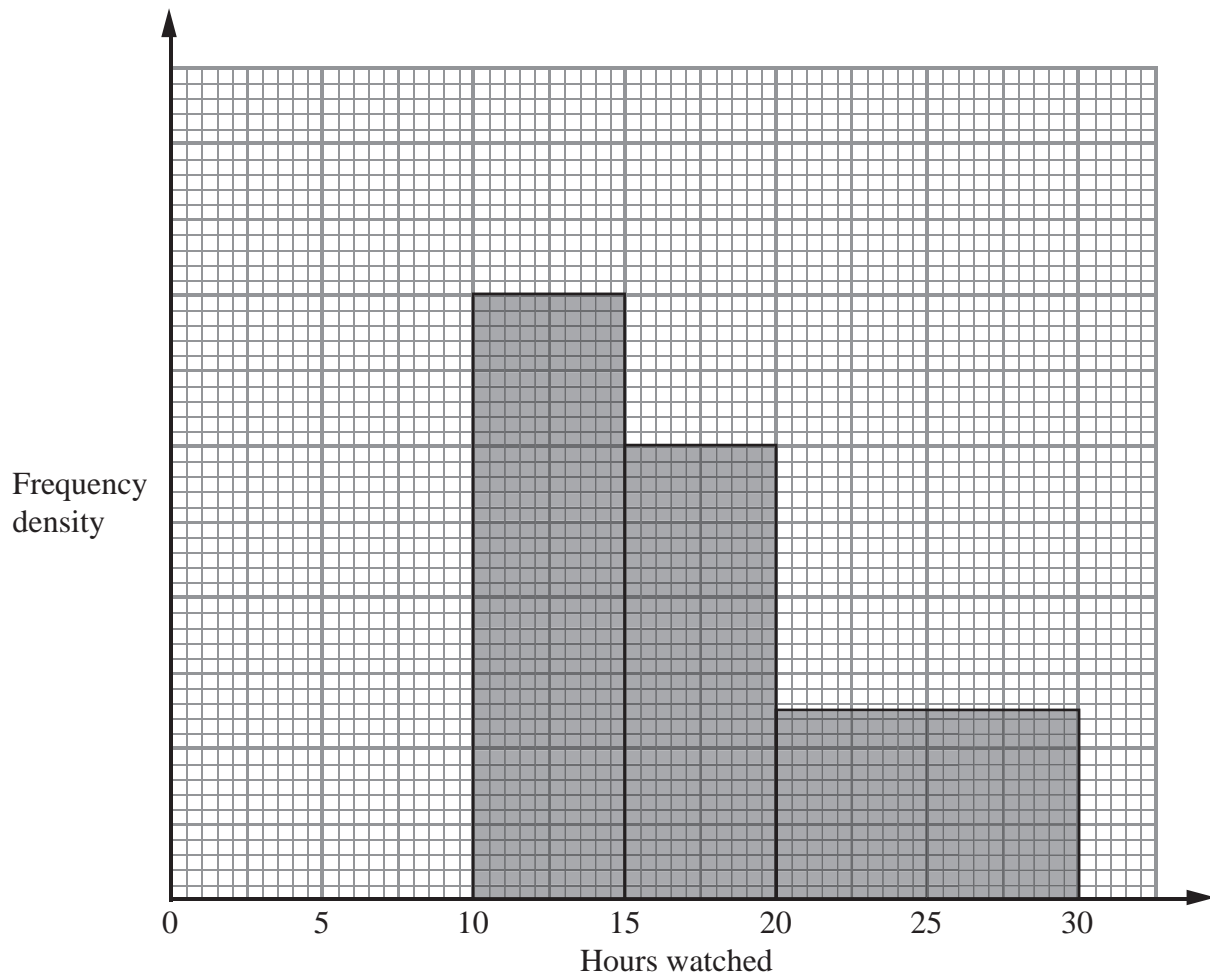
(1)

(Total 3 marks)



8. Terry asked the students in his class how many hours they played on computers last week.

The incomplete histogram was drawn using his results.



Eight students played for between 10 and 15 hours. Six students played for between 0 and 10 hours.

(a) Use this information to complete the histogram.

(2)

No students watched television for more than 30 hours.

(b) Work out how many students Terry asked.

.....
(2)

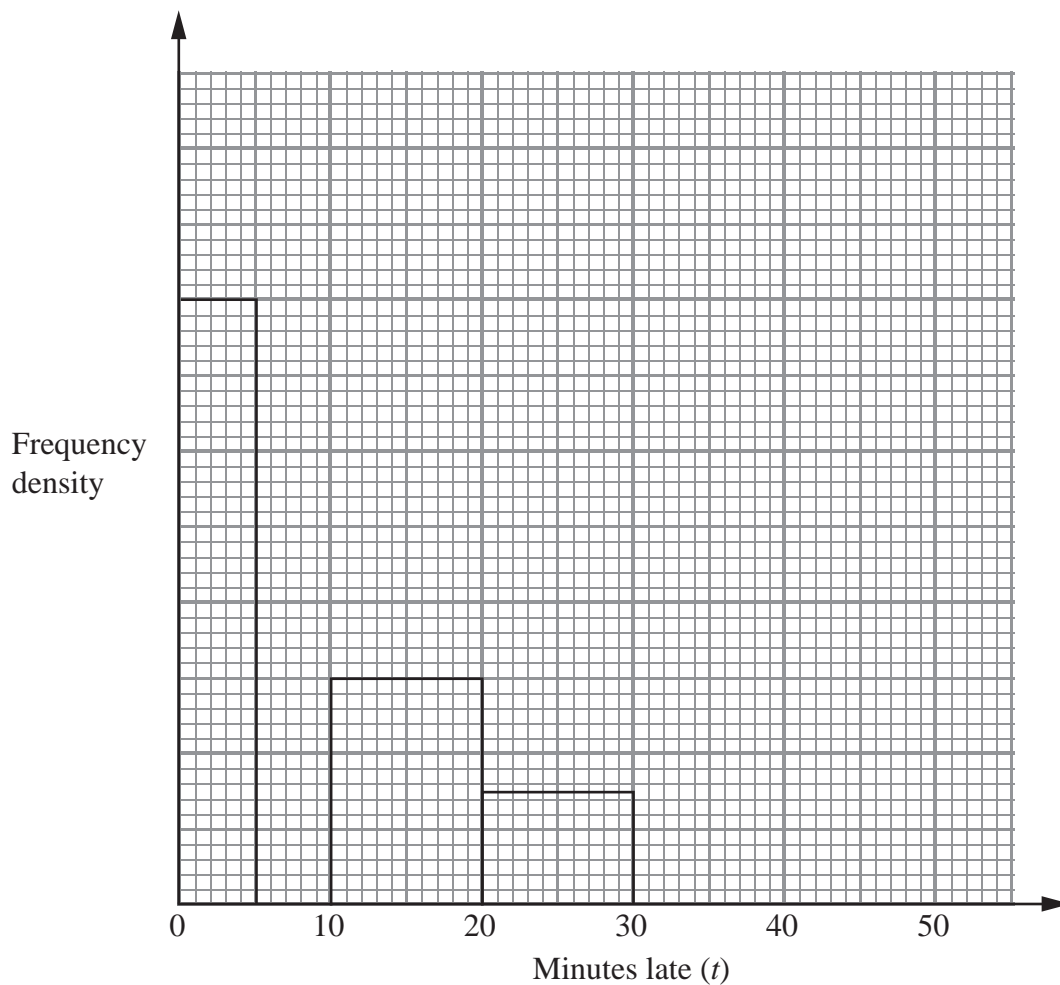
(Total 4 marks)



9. Some trains from London to Birmingham were late.

The incomplete table and histogram gives some information about how late the trains were.

Minutes late (t)	Frequency
$0 < t \leq 5$	16
$5 < t \leq 10$	10
$10 < t \leq 20$	
$20 < t \leq 30$	
$30 < t \leq 50$	6



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

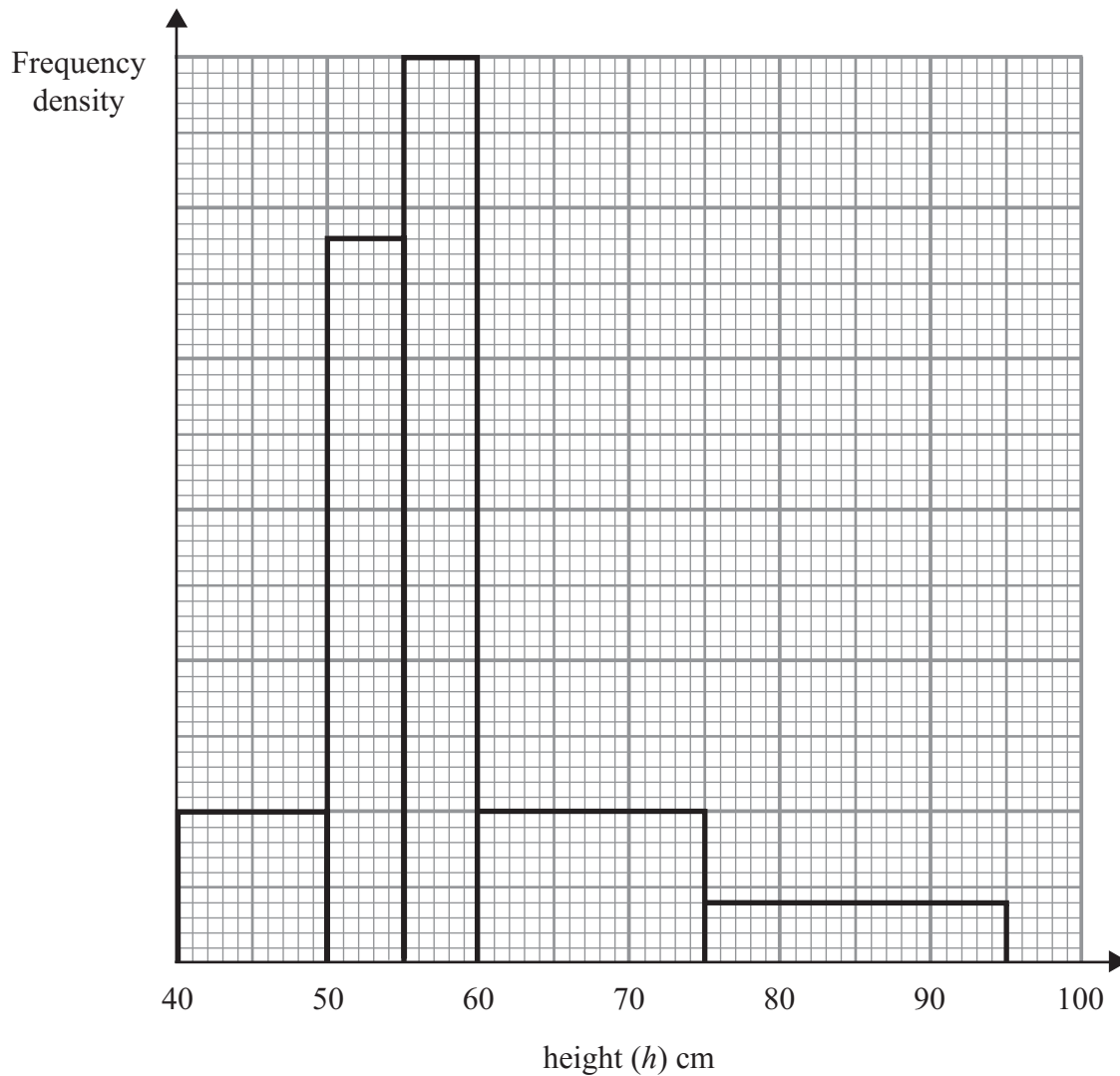
(2)

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

(2)



10. The incomplete table and histogram give some information about the heights of some tomato plants in a greenhouse.



Use the information in the histogram to complete the frequency table.

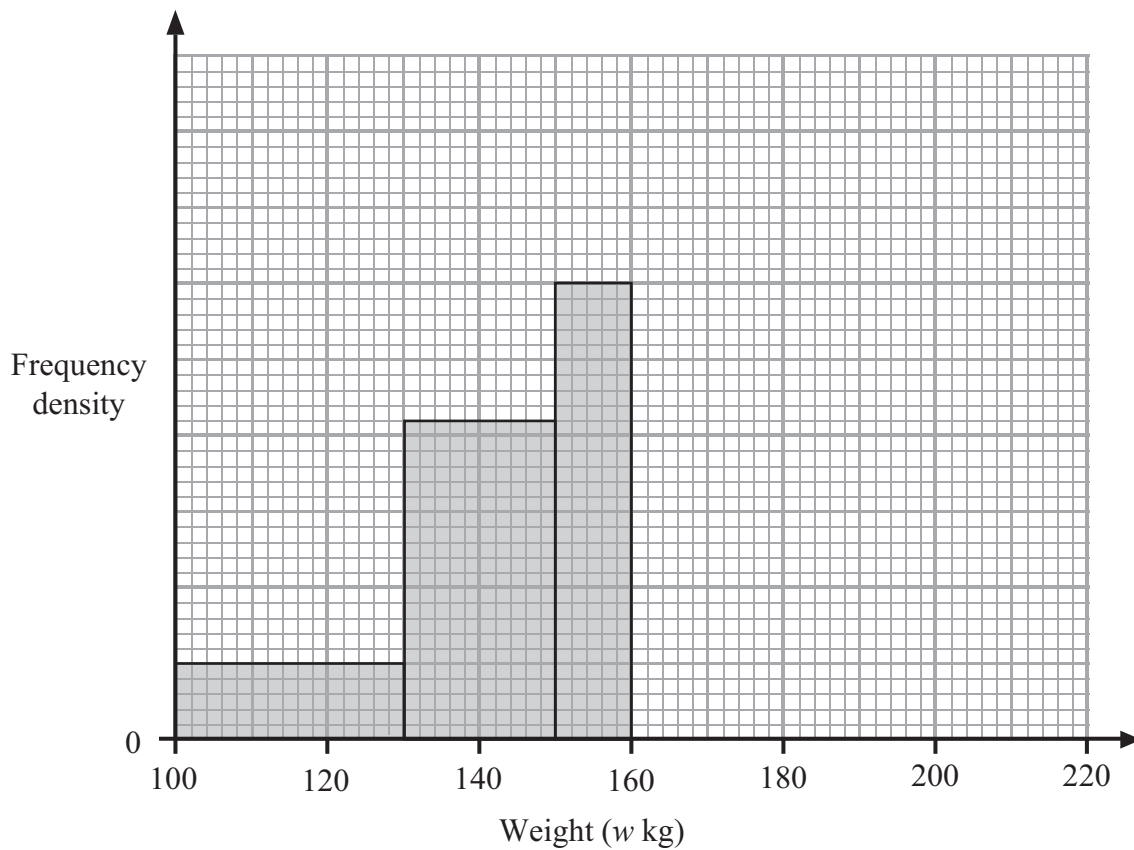
Height (h) cm	Frequency
$40 \leq h < 50$	10
$50 \leq h < 55$	
$55 \leq h < 60$	
$60 \leq h < 75$	15
$75 \leq h < 95$	8

(Total 2 marks)



11. The incomplete table and histogram give some information about the weights (in kg) of some boxes.

Weight (w kg)	Frequency
$100 < w \leq 130$	30
$130 < w \leq 150$	
$150 < w \leq 160$	
$160 < w \leq 180$	40
$180 < w \leq 210$	18



(a) Use the histogram to complete the table. (2)

(b) Use the table to complete the histogram. (2)

(Total 4 marks)



12. The table and histogram show information about the length of time it took 165 adults to drink some water.

Time (t seconds)	Frequency
$0 < t \leq 10$	20
$10 < t \leq 15$	
$15 < t \leq 17.5$	30
$17.5 < t \leq 20$	40
$20 < t \leq 25$	
$25 < t \leq 40$	

None of the adults took more than 40 seconds to drink the water

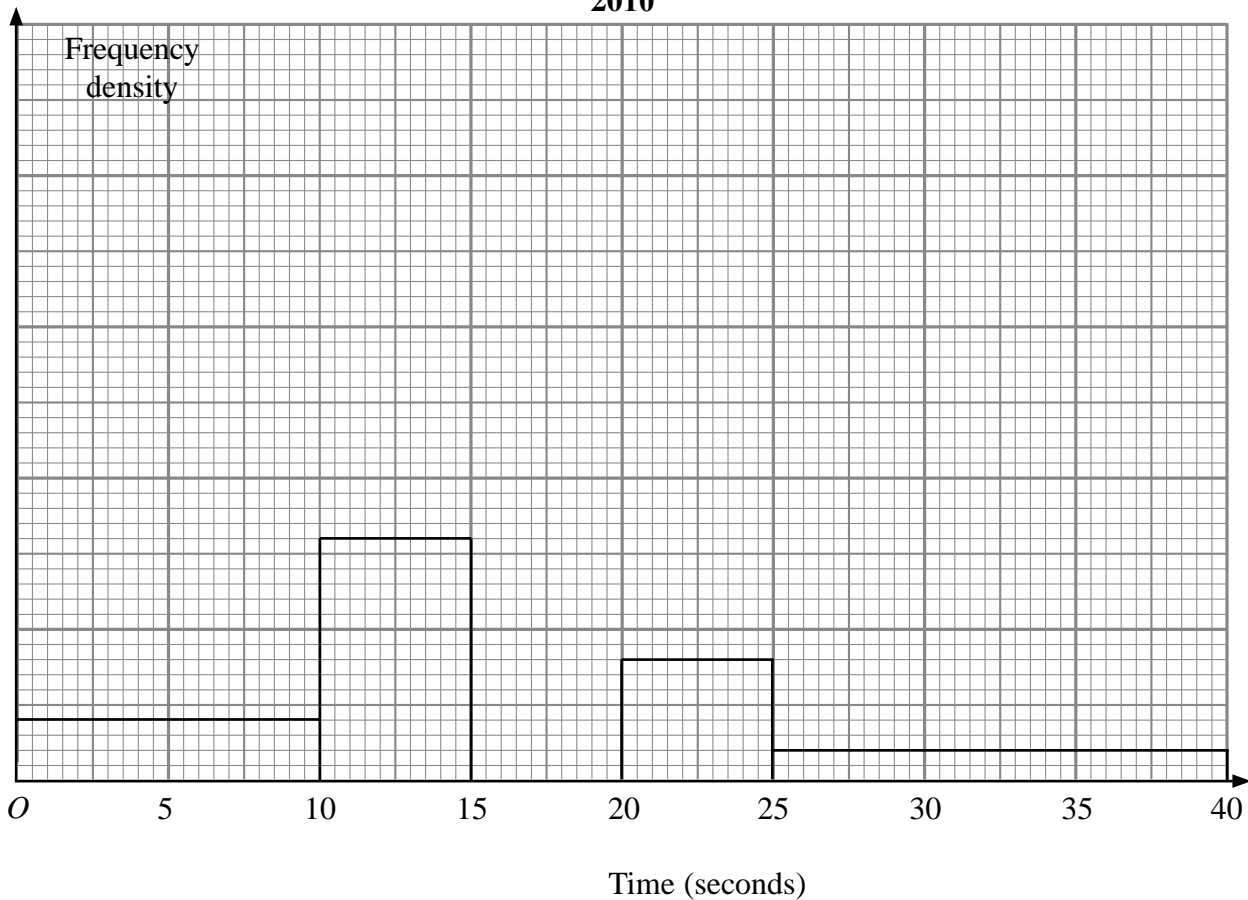
(a) Use the table to complete the histogram.

(2)

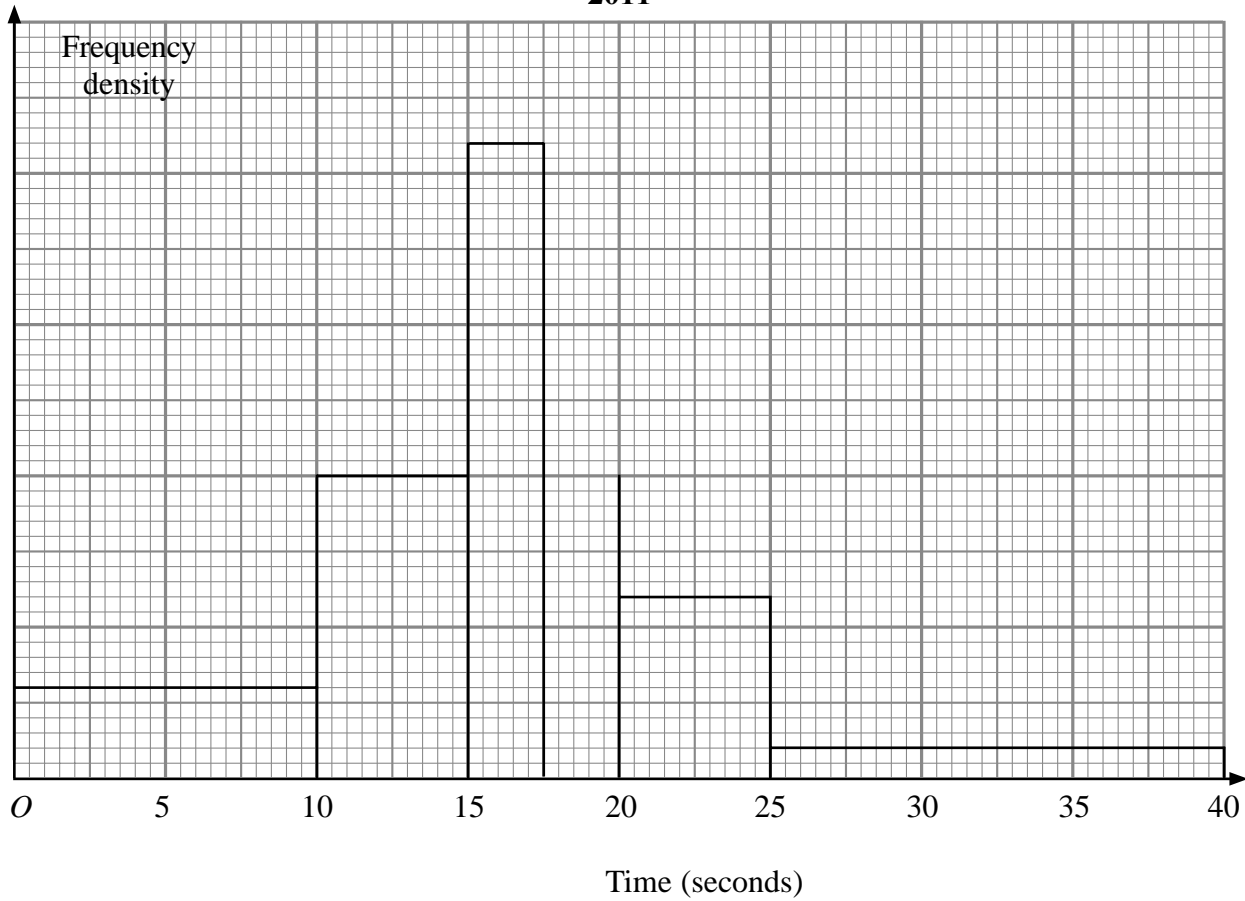
(b) Use the histogram to complete the table.

(2)

2010



2011



The histogram shows information about the time it took some children to drink the water. None of the children took more than 40 seconds to drink the water.

110 children took up to 12.5 seconds to drink the water.

- (c) Work out an estimate for the number of children who took 21 seconds or more to drink the water.

.....
(3)

(Total 7 marks)



Write your name here

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Mathematics A

Locus and Constructions

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**



Information

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Turn over ►



1. (a) Draw the locus of all points which are equidistant from the points C and D .

$C \times$

$\times D$

(2)

(b) Draw the locus of all points that are exactly 3 cm from the line EF .

E

F

(2)

(Total 4 marks)



2. Draw the locus of all points which are equidistant from the lines XY and XZ .



(Total 2 marks)

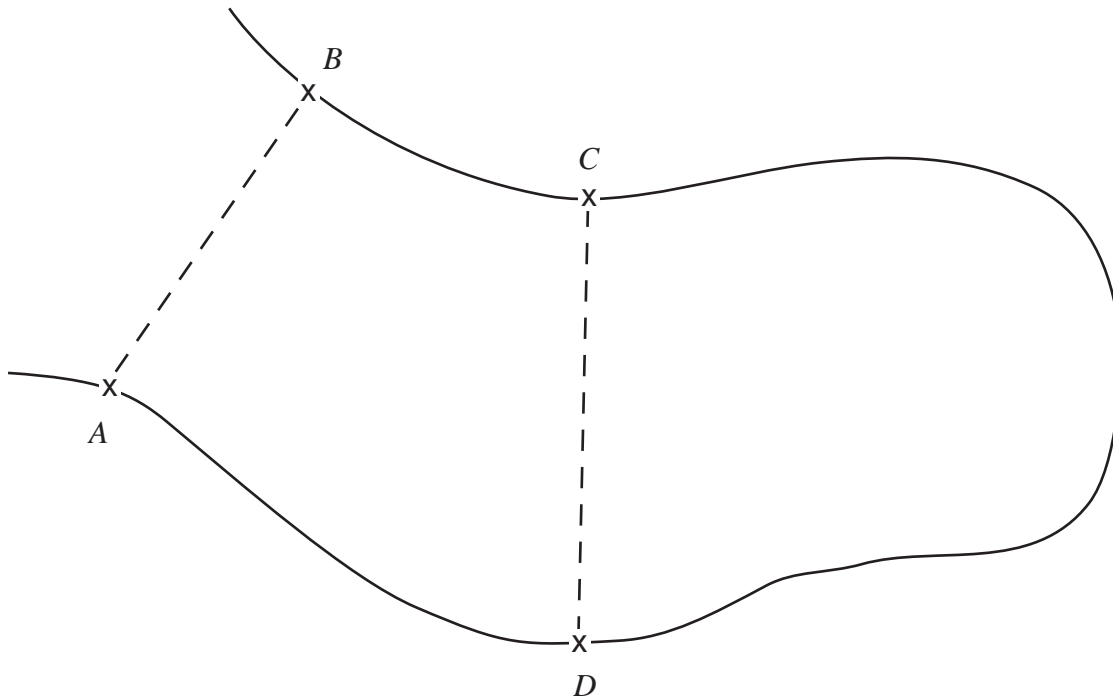


3. The map shows part of a golf course.

A golfer has to hit a ball so that its path between AB and CD is a straight line

and is always the same distance from *A* as from *B*

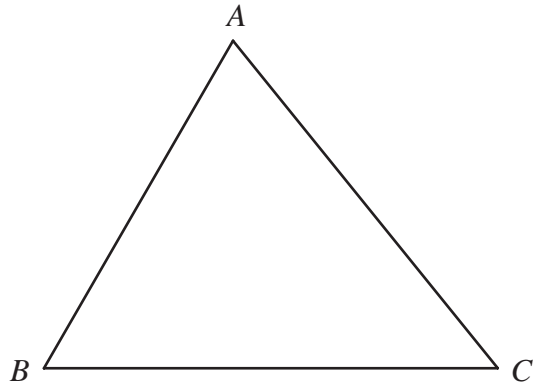
On the map, draw the path the ball should take.



(Total 2 marks)



4.



ABC is a triangle.

Shade the region inside the triangle which is **both**

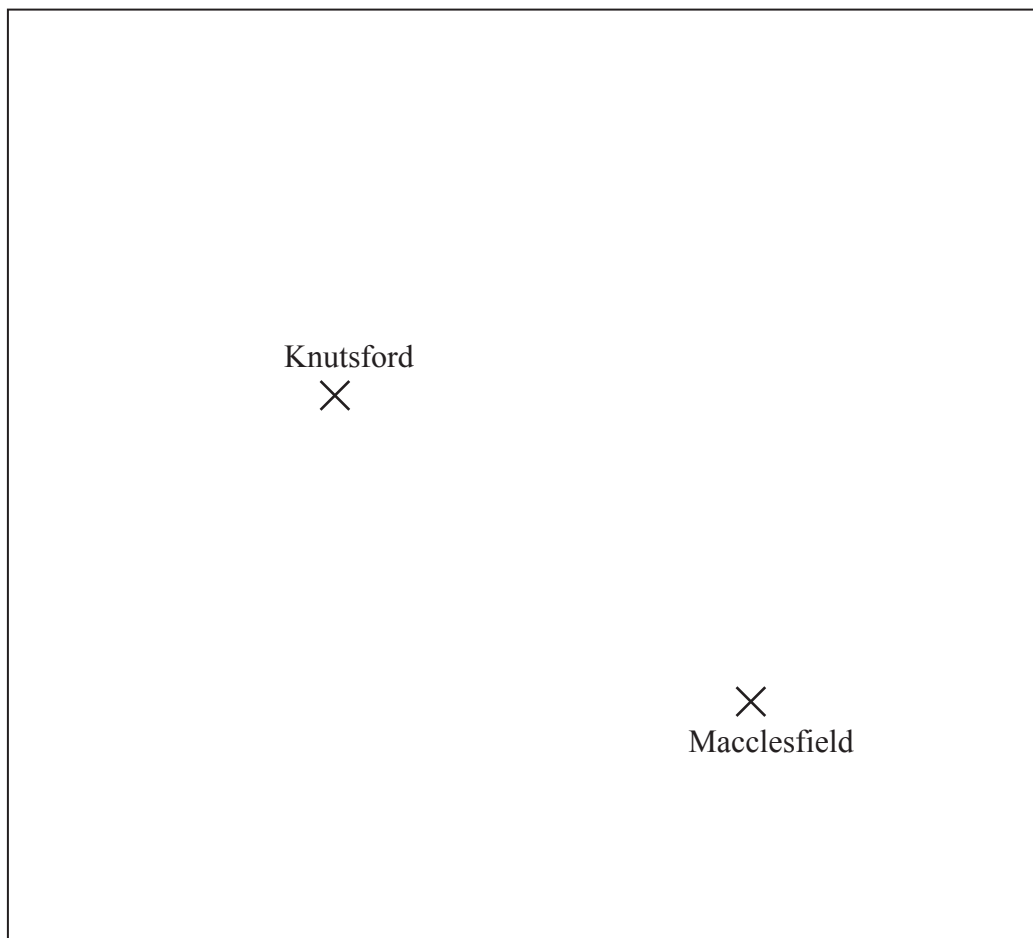
and less than 4 centimetres from the point B
closer to the line AC than the line AB .

(Total 4 marks)



5. Here is a map.

The map shows two towns, Knutsford and Macclesfield.



Scale: 1 cm represents 10 km

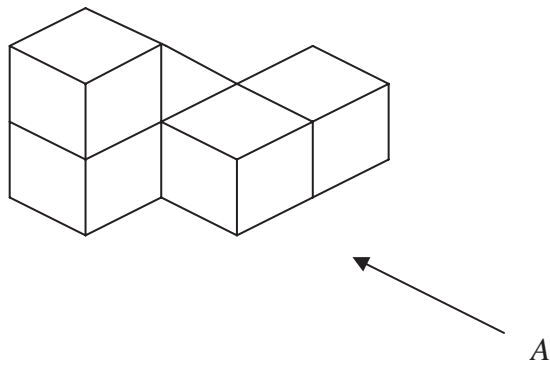
A company is going to build a glasshouse.

The glasshouse will be less than 30 km from Knutsford **and** less than 50 km from Macclesfield. Shade the region on the map where the company can build the glasshouse.

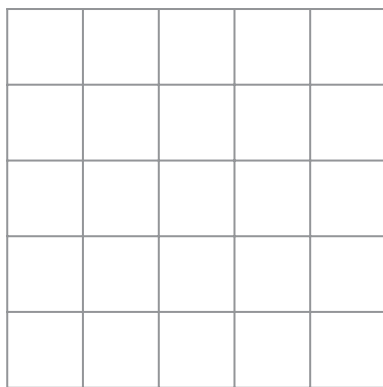
(Total for Question 10 is 3 marks)



6. The diagram represents a solid made from 5 identical cubes.



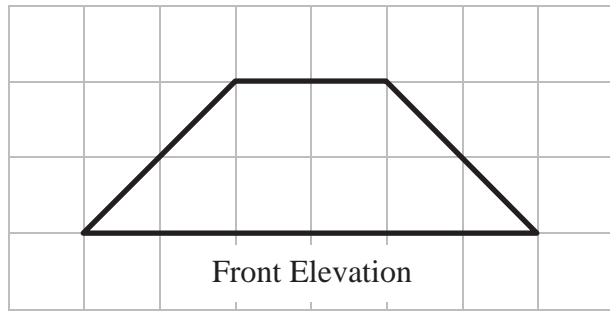
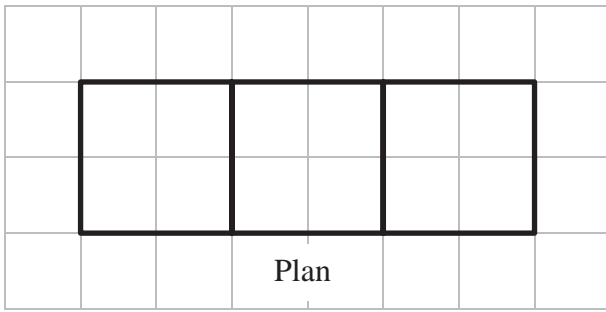
On the grid below, draw the view of the solid from direction A.



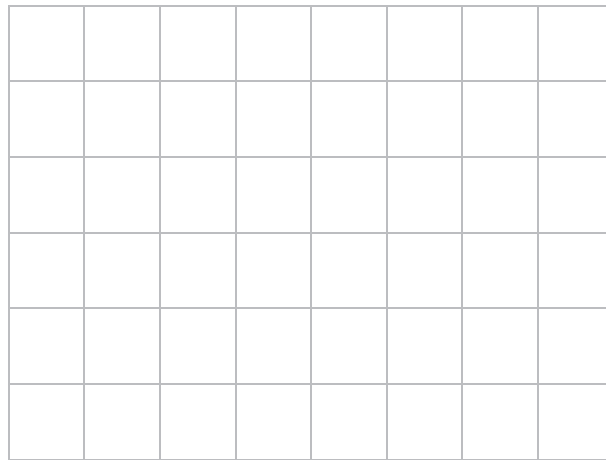
(Total 2 marks)



7. Here are the plan and front elevation of a solid shape.



(a) On the grid below, draw the side elevation of the solid shape.



(2)

(b) In the space below, draw a sketch of the solid shape.

(2)

(Total 4 marks)



8. In the space below, use ruler and compasses to **construct** an equilateral triangle with sides of length 6 centimetres.

You must show all your construction lines.

One side of the triangle has already been drawn for you.



(Total 2 marks)



9. Here is a sketch of a quadrilateral.

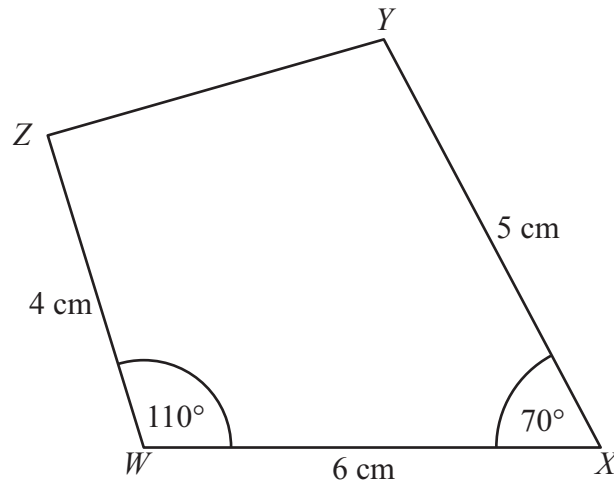


Diagram **NOT** accurately drawn

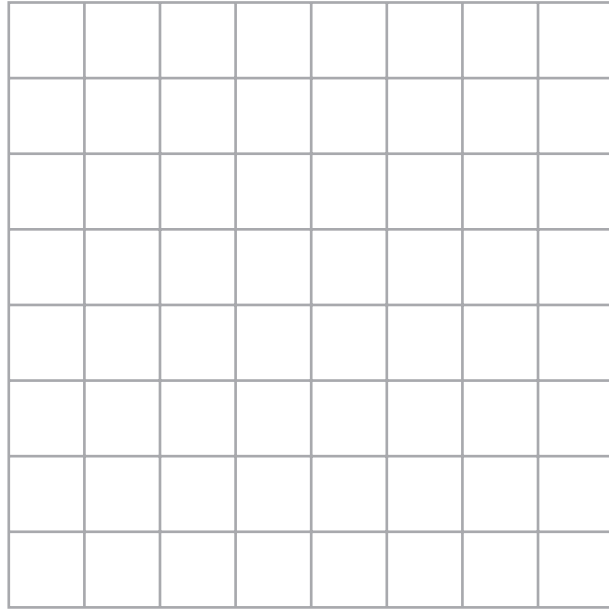
Make an accurate drawing of the quadrilateral $WXYZ$ in the space below.
The point W , marked with a cross (\times), has been drawn for you.

$W \times$

(Total 4 marks)

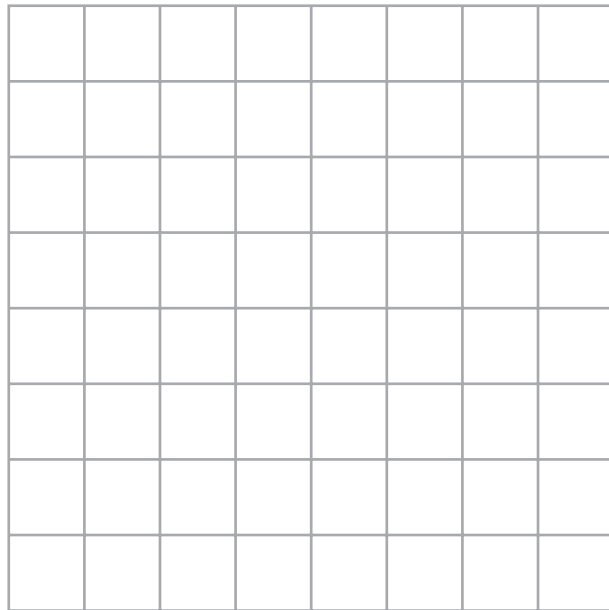


10. (a) On the grid, draw an isosceles triangle.



(1)

(b) On the grid, draw a rectangle with an area of 20 cm^2 .



(2)

(Total 3 marks)



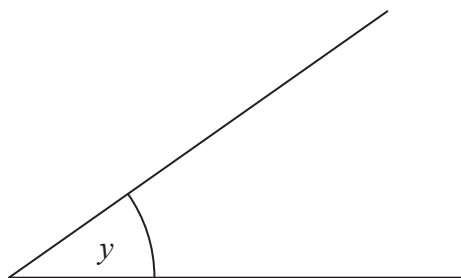
11. (a) Measure the length of the line AB .
Give your answer in centimetres.



..... cm

(1)

- (b) Measure the size of angle y .



..... °

(1)

- (c) In the space below, draw accurately a circle of radius 4 cm.
Use the point C as the centre of your circle.

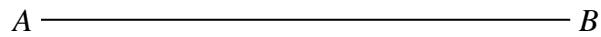
$\times C$

(1)



12. Use ruler and compasses to **construct** the perpendicular bisector of the line AB .

You must show all your construction lines.



(Total 2 marks)



- (b) Use ruler and compasses to construct the perpendicular bisector of the line RS .
You must show all your construction lines.

R _____ S

(2)

(Total 4 marks)



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

T —————

(Total 3 marks)



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Mathematics A

Number

Foundation Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks



Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
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Information

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- Check your answers if you have time at the end.

Turn over ►



1(a) Work out $7500 + 1500$

Write your answer in words.

.....
(2)

1(b) Write 4748 to the nearest hundred.

.....
(1)

1(c) What is the value of the digit 5 in the number 425 986?

.....
(1)

1(d) Write down the positive square root of 121.

.....
(1)

1(e) Which of these is equal to one million?

Circle your answer.

10^3 10^4 10^5 10^6 10^7



2. Use the numbers from this list to answer the questions.

5 12 17 25 28 30 42 49

(a) Write down all the multiples of 5.

.....

(2)

(b) Write down all the factors of 100.

.....

(2)

(c) Write down a square number.

.....

(1)

(d) Write down three numbers that have a sum of 60.

..... and..... and.....

(1)

3. Here are two numbers.

forty thousand

7500

Which number is bigger?

Give a reason for your answer.

Bigger number

Reason

.....

(2)



4. w , x and y are three positive whole numbers. w is one-fifth of y .
 x is one-sixth of y .
 y is less than 100.
What values could y take?

.....

(5)

5. The numbers 13 and 17 are consecutive prime numbers.
The number halfway between them is 15.
15 is **not** a square number.

Find a pair of consecutive prime numbers less than 30 where the number halfway between them is a square number.

.....and.....

(2)



6. Work out

$$8^2 \div 4^3$$

.....

(2)

7. You are given that $34.7 \times 25 = 867.5$

(a) Write down the value of 347×25

.....

(1)

(b) Write down the value of $86.75 \div 25$

.....

(1)

(c) Work out the value of 34.7×26

.....

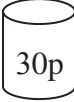
(2)




8. A tin of baked beans costs 30p.
A shop has a special offer on the baked beans.

Special offer


Pay for 2 tins and get 1 tin free



30p



30p



Free

Helen wants 12 tins of baked beans.

- (a) Work out how much she pays.

£
(3)

The normal price of a toaster is £30

In a sale, the price of the toaster is reduced by 15%.

- (b) Work out the sale price of the toaster.

£
(3)

(Total 6 marks)



9. Work out $\frac{1}{5} + \frac{2}{7}$

.....

(Total 2 marks)

10.

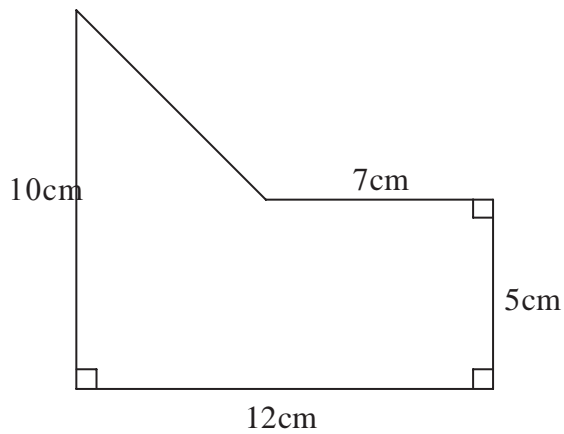


Diagram **NOT**
accurately drawn

Work out the area of the shape.

..... cm²

(Total 4 marks)



11. Use the information that

$$324 \times 46 = 14904$$

to find the value of

(a) 3.24×4.6

.....
(1)

(b) 0.324×0.46

.....
(1)

(c) $14904 \div 4.6$

.....
(1)

(Total 3 marks)

12. $2x^2 = 72$

(a) Find a value of x .

.....
(2)

(b) Express 72 as a product of its prime factors.

.....
(2)

(Total 4 marks)



13. Here are the ingredients needed to make 8 pancakes.

<p style="text-align: center;">Pancakes</p> <p>Ingredients to make 8 pancakes</p> <p>300 ml milk 1 egg 120 g flour 5 g butter</p>

David makes 24 pancakes.

(a) Work out how much milk he needs.

..... ml
(2)

Louis makes 12 pancakes.

(b) Work out how much flour he needs.

..... g
(2)

(Total 4 marks)



14. Shagufta has a part-time job.
She is paid £5.60 for each hour she works.
Last week Shagufta worked for 24 hours.
Work out Shagufta's total pay for last week.

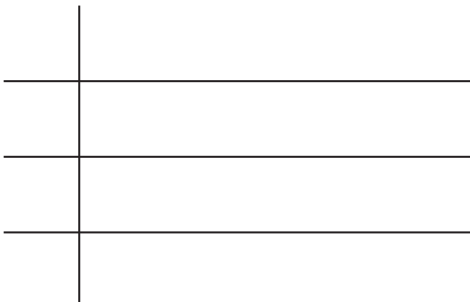
£

(Total 3 marks)

15. Here are the ages, in years, of 15 teachers.

34 53 41 28 37
22 32 40 50 34
44 28 45 45 55

Draw an ordered stem and leaf diagram to show this information.
You must include a key.



Key:



16. Using the information that

$$4.8 \times 36 = 172.8$$

write down the value of

(a) 48×36

.....
(1)

(b) 4.8×3.6

.....
(1)

(c) $172.8 \div 48$

.....
(1)

(Total 3 marks)



17. This rule is used to work out the total cost, in pounds, of hiring a bicycle.

Multiply the number of days' hire by 3
Add 6 to your answer

Peter hires a bicycle.

The total cost is £18

(a) Work out for how many days he hires the bicycle.

..... days
(2)

(b) Write down an expression, in terms of n , for the total cost, in pounds, of hiring a bicycle for n days.

.....
(2)

(Total 4 marks)



18.

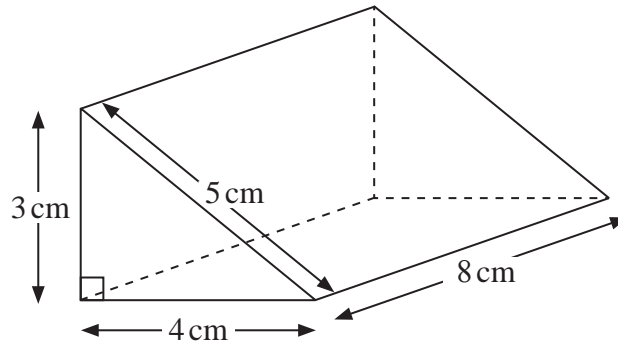


Diagram **NOT**
accurately drawn

Work out the total surface area of the triangular prism.
Give the units with your answer.

.....

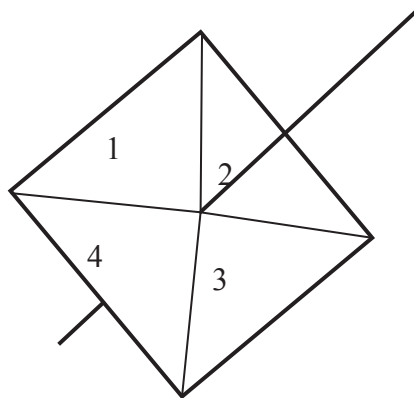
(Total 4 marks)



19. Work out an estimate for $\frac{302 \times 9.96}{0.51}$

.....
(Total 3 marks)

20. Here is a 4-sided spinner.



The sides of the spinner are labelled 1, 2, 3 and 4.

The spinner is biased.

The table shows the probability that the spinner will land on each of the colours 1, 4 and 3.

Colour	1	2	3	4
Probability	0.2		0.3	0.1

Work out the probability the spinner will land on 2.

.....
(Total 2 marks)



21. (a) Write down the reciprocal of 5

.....
(1)

(b) Work out the value of $2\frac{4}{5} - 1\frac{3}{4}$

Give your answer as a fraction in its simplest form.

.....
(3)

(c) Derek says that $4\frac{1}{3}$ is equal to 4.3

Derek is **wrong**.

Explain why.

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

(Total 5 marks)



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Candidate Number

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Mathematics A

Probability Tree

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

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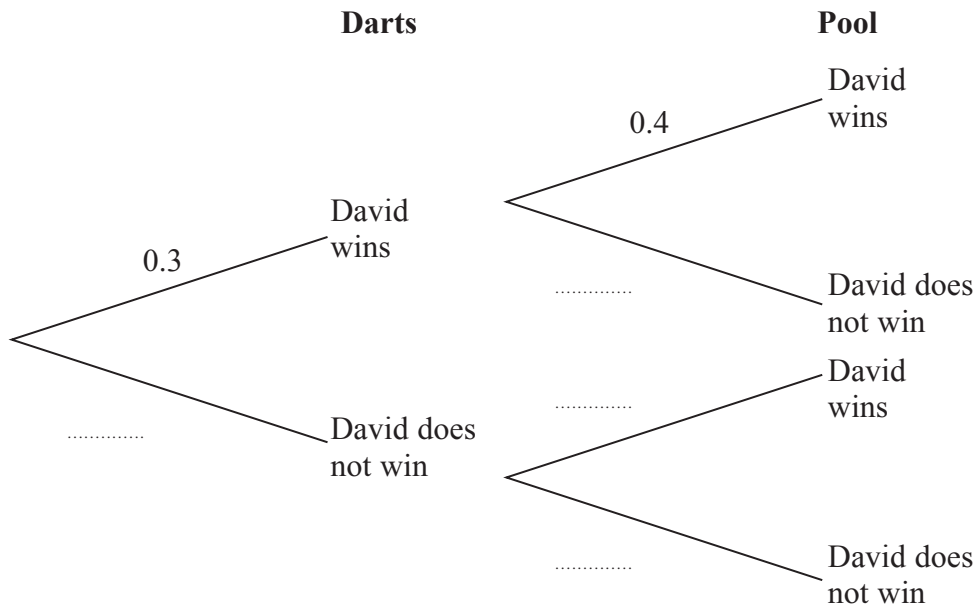
Turn over ►



1. David goes to a club.
He has one go at Darts. He has one go at Pool.

The probability that he wins at Darts is 0.3
The probability that he wins at Pool is 0.4

- (a) Complete the probability tree diagram.



(2)

- (b) Work out the probability that David wins at Darts and also wins at Pool.

(2)

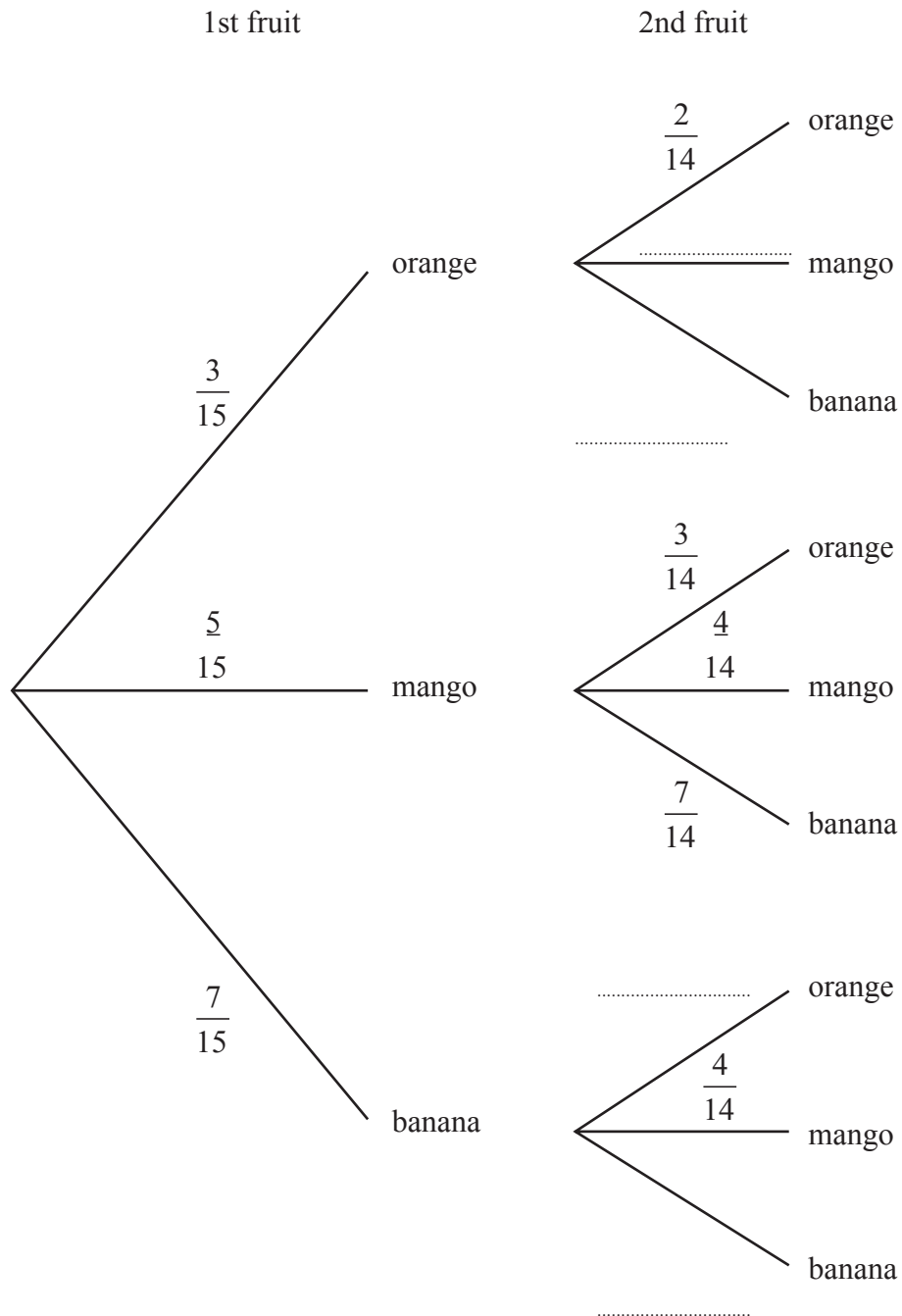
Total for Question 1 is 4 marks)



2. A bowl contains 3 oranges, 5 mangoes and 7 bananas.

One fruit is taken, at random, from the bowl and **not** replaced. Another fruit is then taken, at random, from the bowl.

A tree diagram representing these two events is shown below.



(a) Complete the tree diagram representing these two events.

(2)

(b) Find the probability that both fruit are bananas. Give your answer as a simplified fraction.

(2)



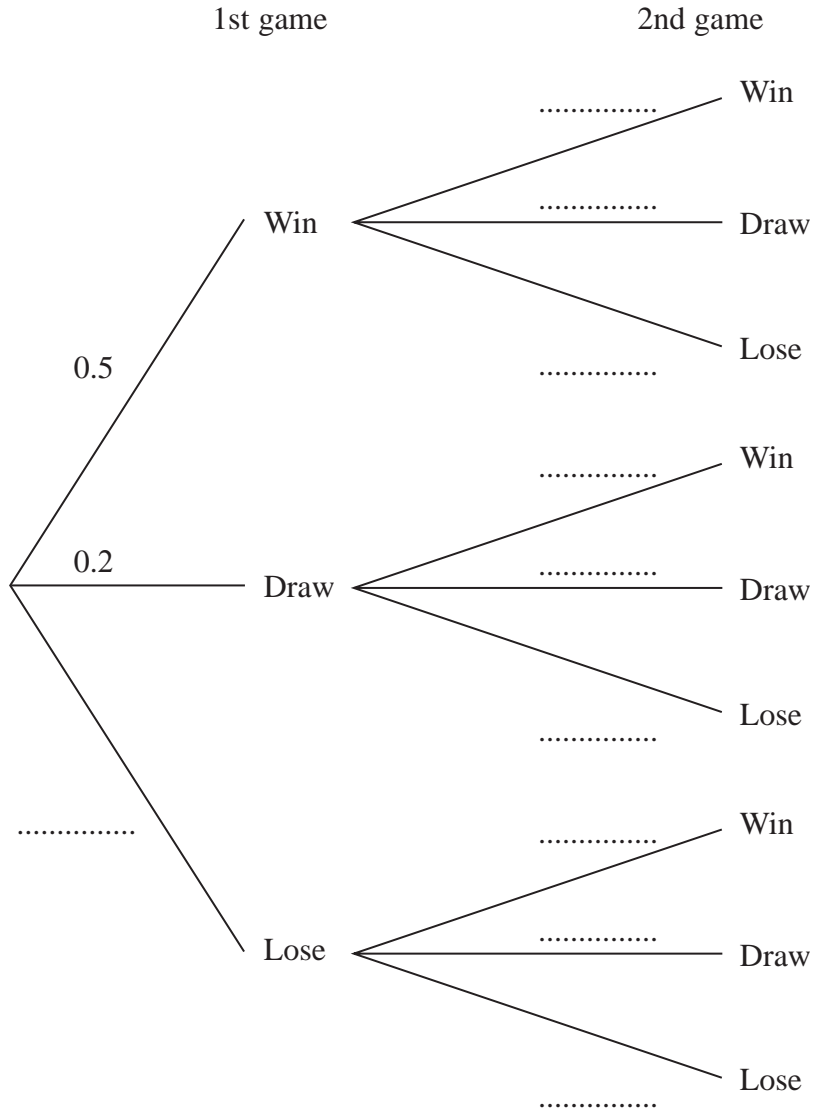
4. In a game of chess, a player can either win, draw or lose.

The probability that Sophie wins any game of chess is 0.5

The probability that Sophie draws any game of chess is 0.2

Sophie plays 2 games of chess.

(a) Complete the probability tree diagram.



(2)

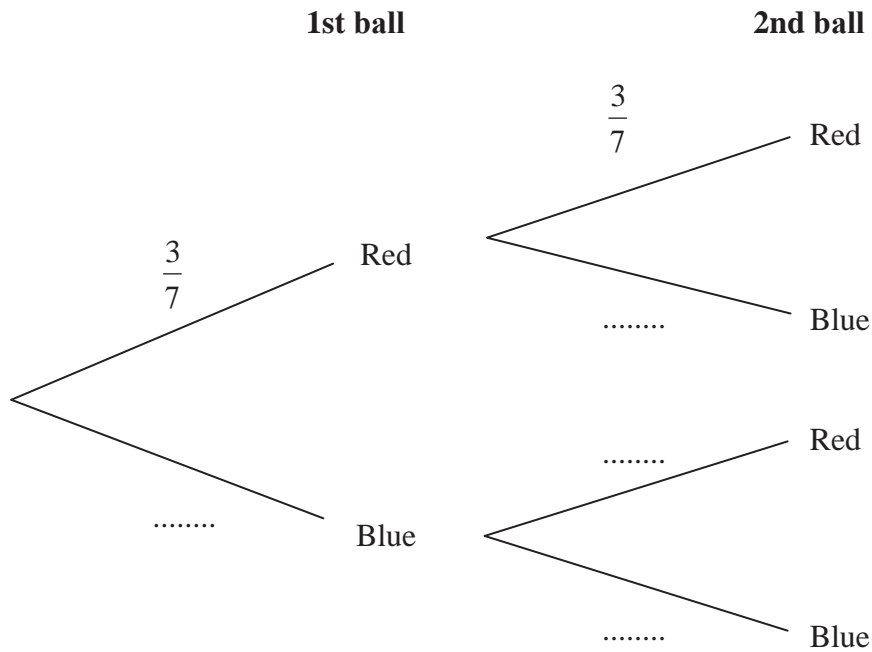
(b) Work out the probability that Sophie will win both games.

.....
(2)



5. Louis puts 3 red balls and 4 blue balls in a bag.
 He takes at random a ball from the bag.
 He writes down the colour of the ball.
 He puts the ball in the bag again.
 He then takes at random a second ball from the bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Louis takes two red balls.

.....

(2)

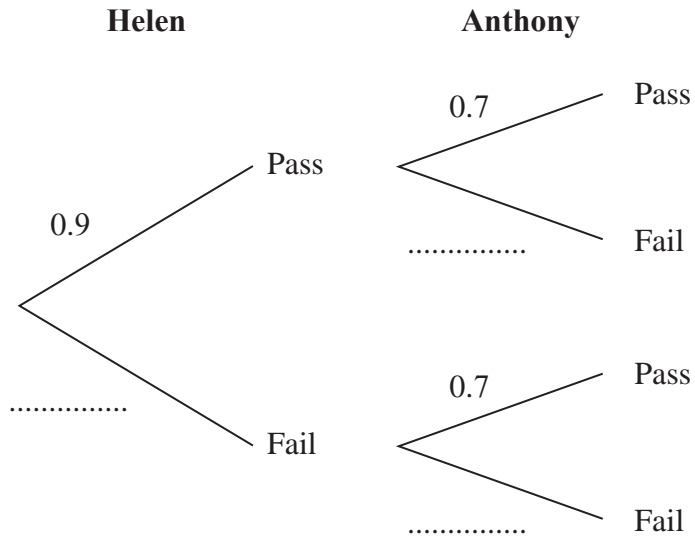
(Total 4 marks)



6. Helen and Anthony each take a medical.

The probability that Helen will pass the medical is 0.9 The probability that Anthony will pass the medical is 0.7

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that both Helen and Anthony will pass the medical.

.....
(2)

(c) Work out the probability that only one of them will pass the medical.

.....
(3)

(Total 7 marks)



7. There are 3 red sweets, 2 purple sweets and 5 orange sweets in a bag.

Georgina takes a sweet at random.

She eats the sweet.

She then takes another sweet at random.

Work out the probability that both the sweets are the same colour.

.....

(Total 4 marks)

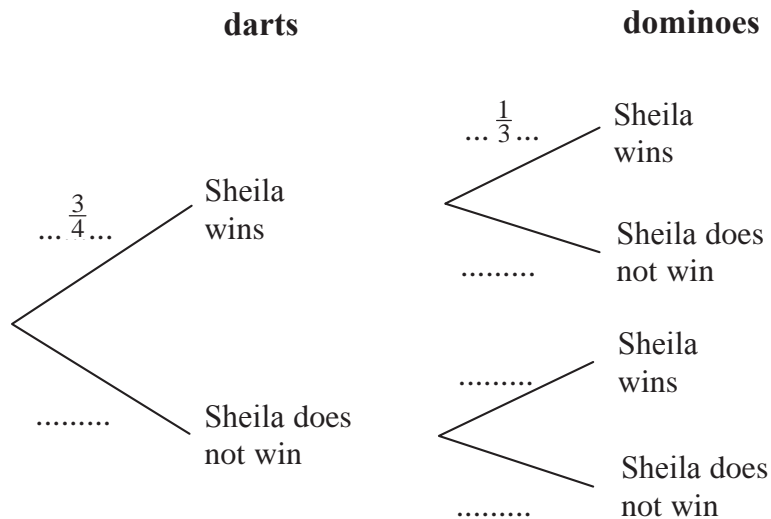


8. Sheila is going to play one game of darts and one game of dominoes.

The probability that she will win the game of darts is $\frac{3}{4}$

The probability that she will win the game of dominoes is $\frac{1}{3}$

is (a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Sheila will win **exactly** one game.

.....
(3)

Sheila played one game of darts and one game of dominoes on a number of Fridays.
She won at **both** darts and dominoes on 21 Fridays.

(c) Work out an estimate for the number of Fridays on which Sheila did not win either game.

.....
(3)

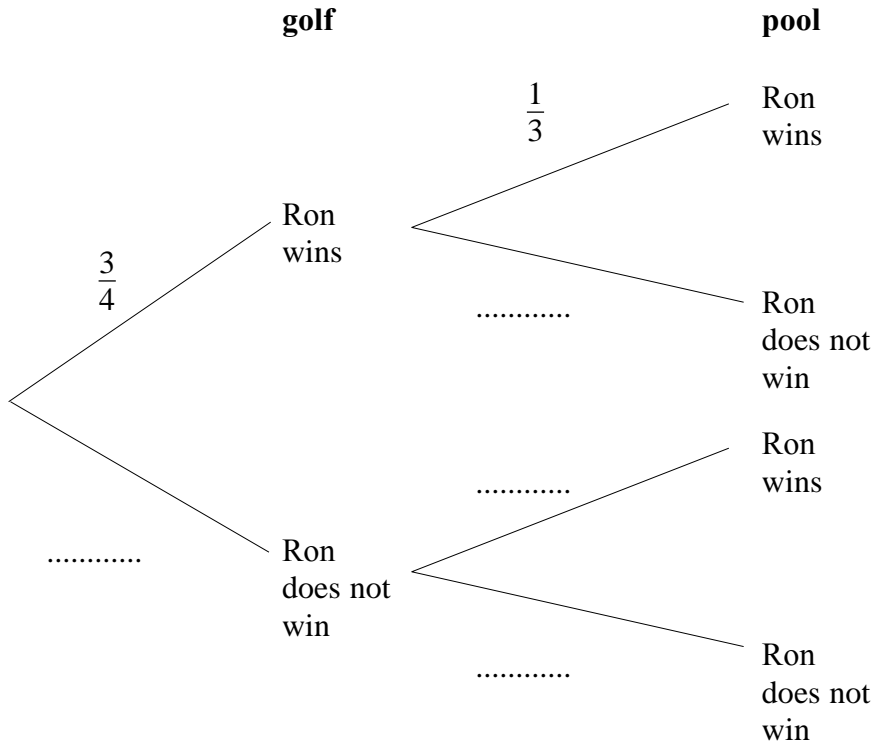
(Total 8 marks)



9. Ron plays one game of golf and one game of pool.

The probability that Ron will win at golf is $\frac{3}{4}$. The probability that Ron will win at pool is $\frac{1}{3}$.

(a) Complete the probability tree diagram below.



(2)

(b) Work out the probability that Ron wins both games.

.....
(2)

(c) Work out the probability that Ron will win only one game.

.....
(3)

(Total 7 marks)



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Mathematics A

Quadratic Graphs

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks



Instructions

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Turn over ►



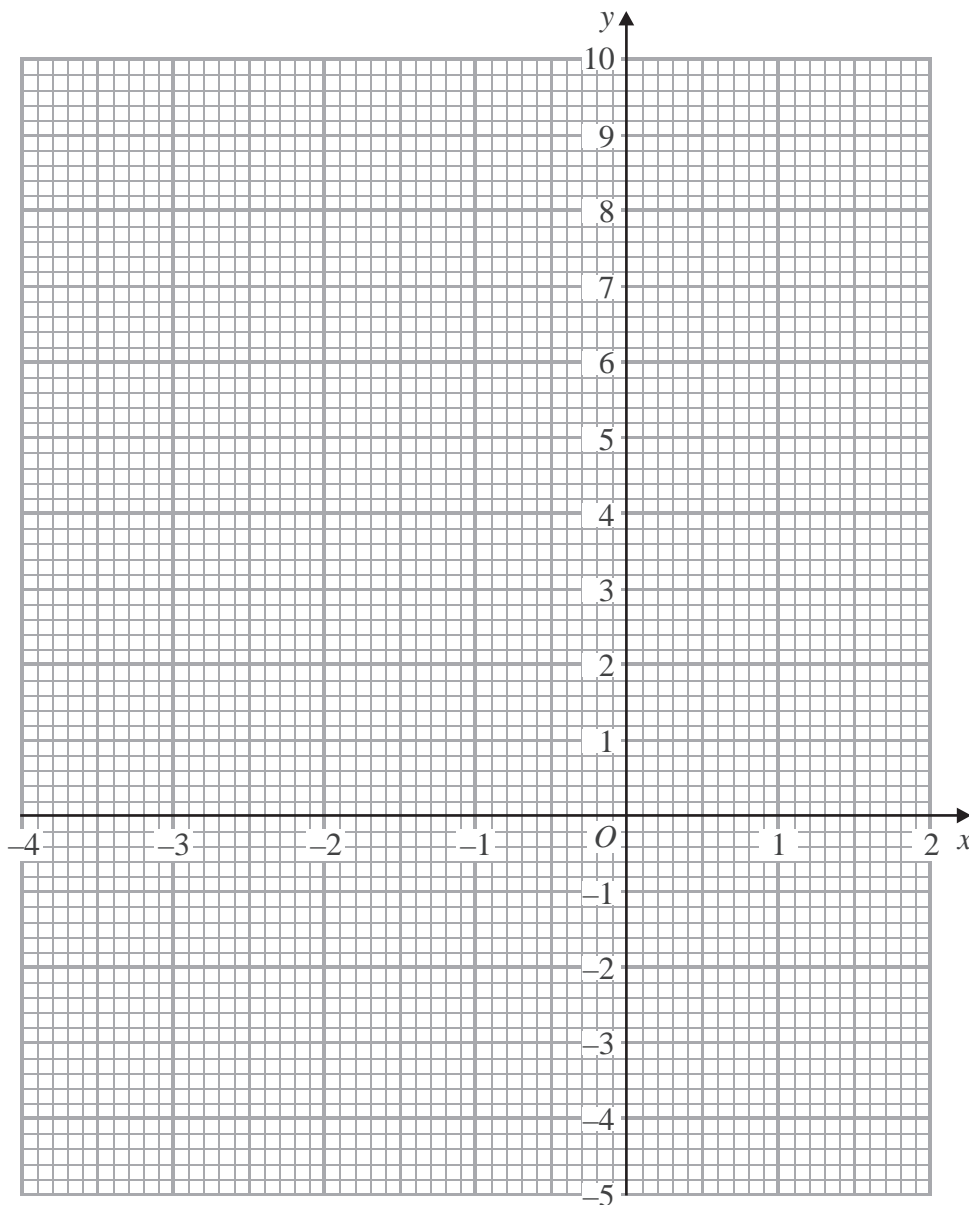
1. (a) Complete the table of values for $y = x^2 + x - 2$

x	-4	-3	-2	-1	0	1	2
y	10		0	-2			4

(2)

(b) On the grid below, draw the graph of $y = x^2 + x - 2$ for values of x from -4 to 2

(2)



(c) Use your graph to find estimates for the solutions of $x^2 + x - 2 = 0$

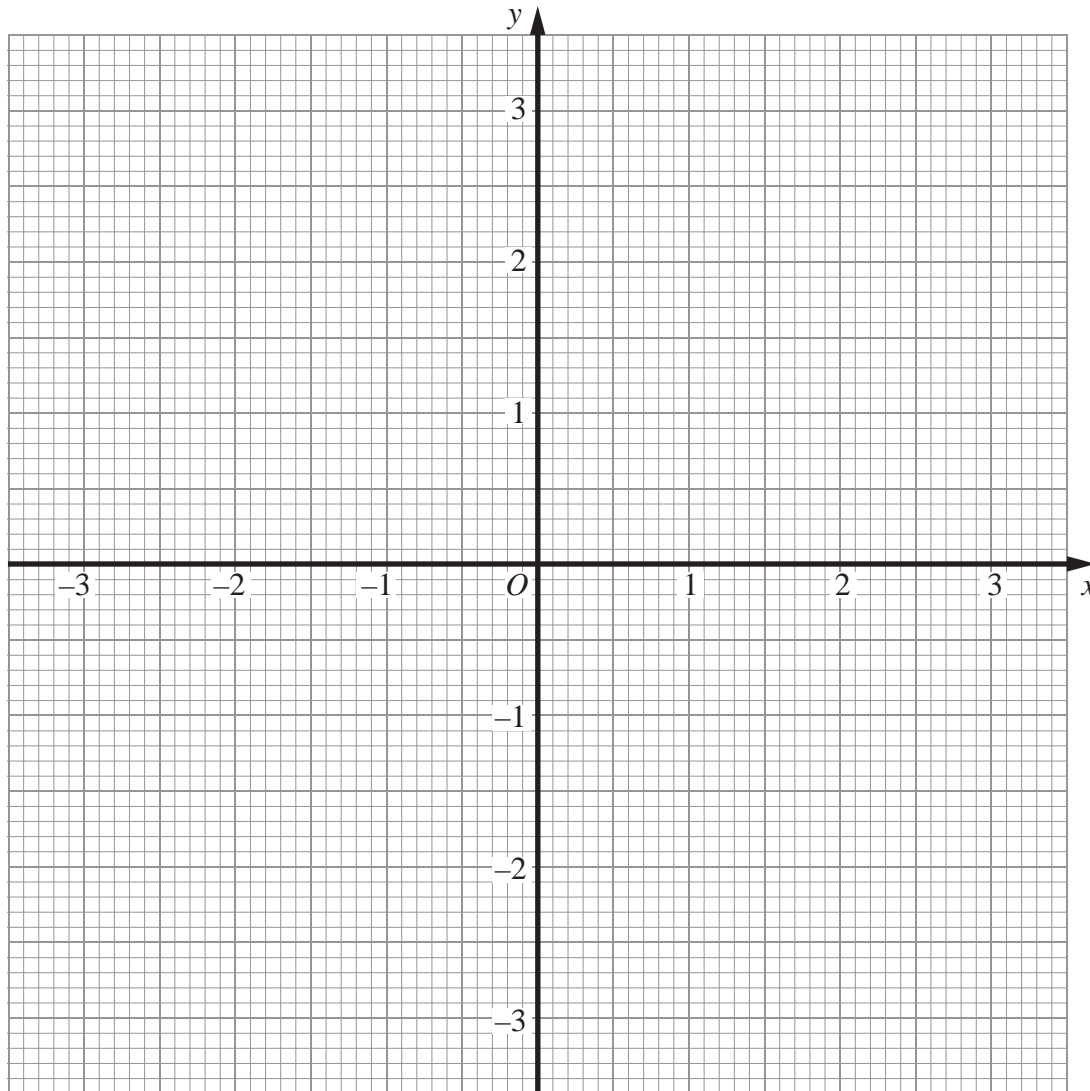
$x = \dots\dots\dots$

$x = \dots\dots\dots$
(1)

(Total 5 marks)



2. (a) Construct the graph of $x^2 + y^2 = 9$



(2)

(b) By drawing the line $x + y = 2$ on the grid, solve the equations $x^2 + y^2 = 9$
 $x + y = 2$

$x = \dots\dots\dots$, $y = \dots\dots\dots$

or $x = \dots\dots\dots$, $y = \dots\dots\dots$

(3)

(Total 5 marks)

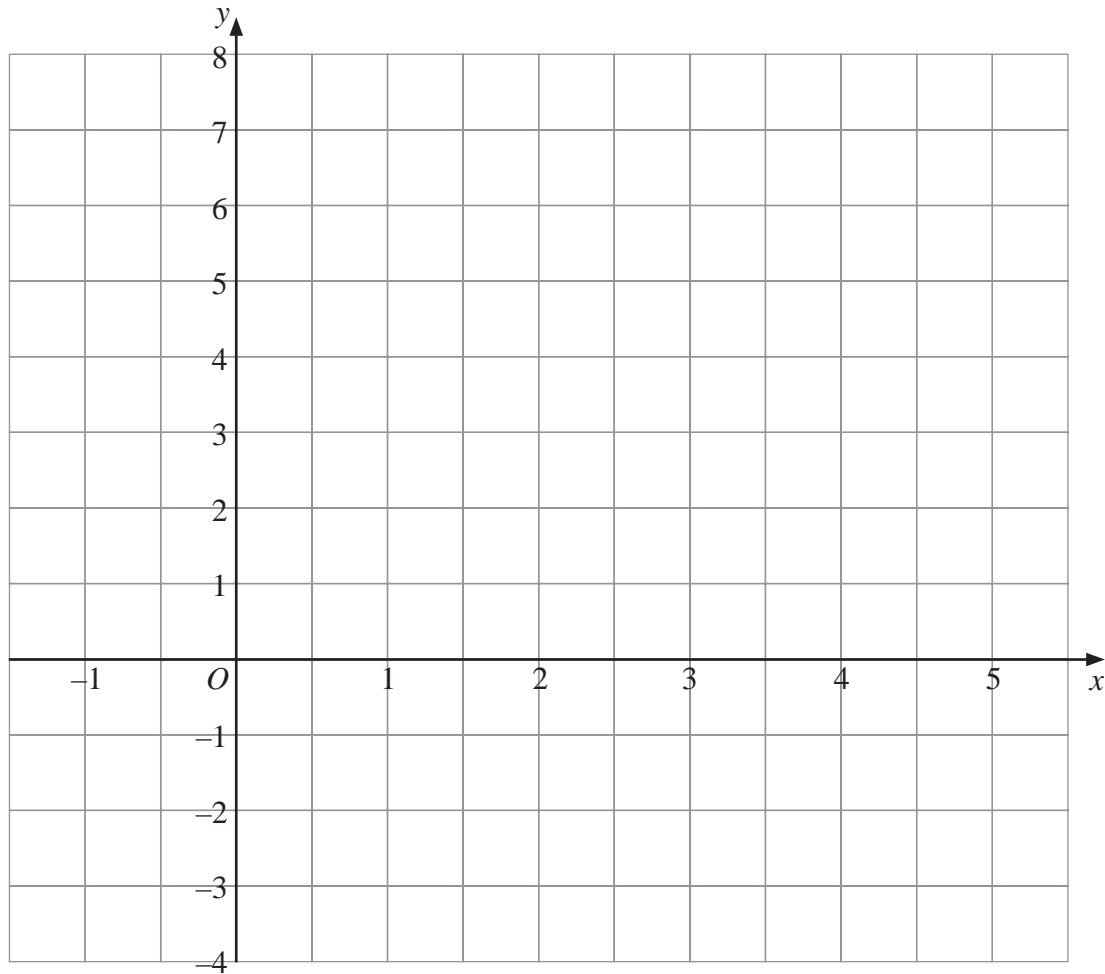


3. (a) Complete the table of values for $y = x^2 - 4x + 1$

x	-1	0	1	2	3	4	5
y		1	-2		-2		6

(2)

(b) On the grid, draw the graph of $y = x^2 - 4x + 1$



(2)

(Total 4 marks)

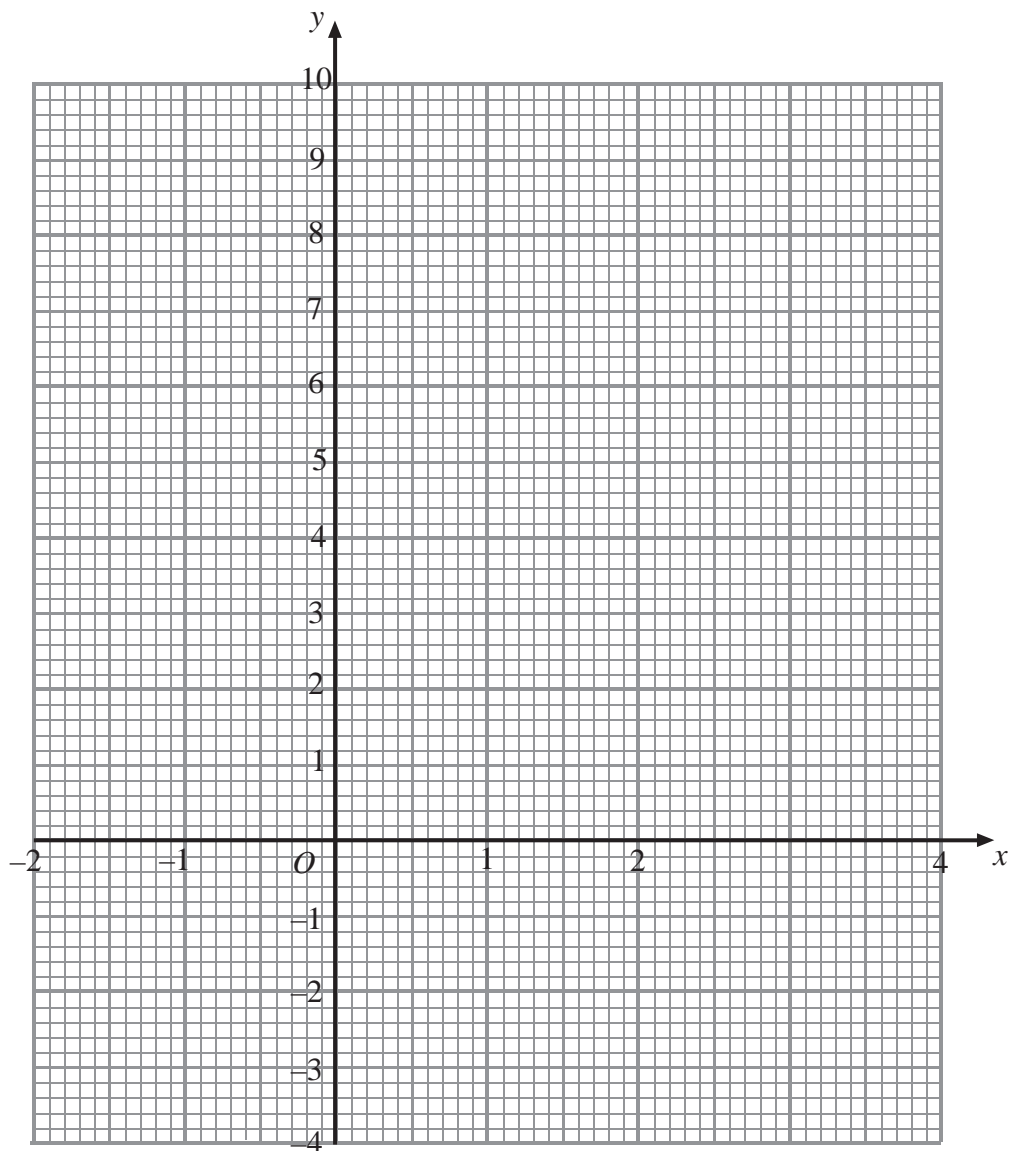


4. (a) Complete the table of values for $y = x^2 - 3x - 1$

x	-2	-1	0				
y		3	1	-3		-1	

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x - 1$ for values of x from -2 to 4



(2)

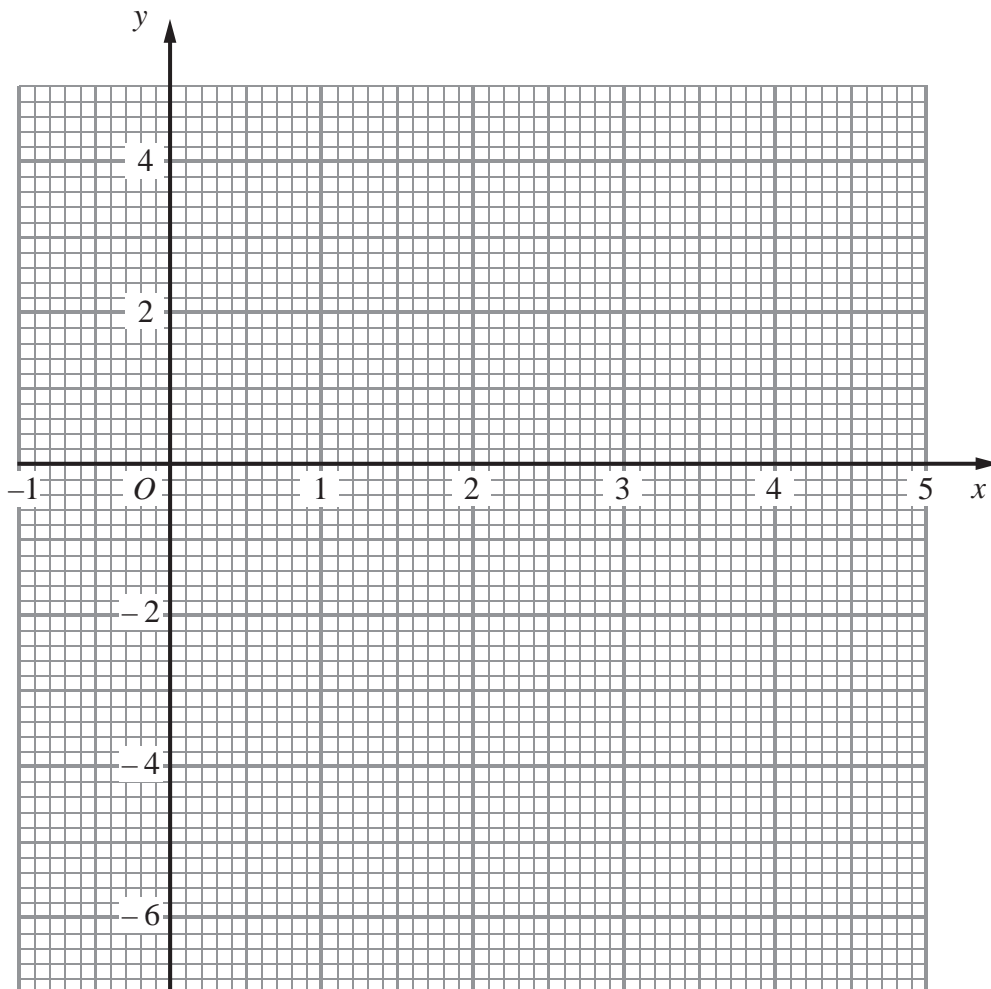


5. (a) Complete the table of values for $y = x^2 - 4x - 1$

x	-1	0	1	2	3	4	5
y		-1	-4			-1	4

(2)

(b) On the grid, draw the graph of $y = x^2 - 4x - 1$



(2)

(c) Use your graph to estimate the values of x when $y = -3$

$x = \dots\dots\dots$

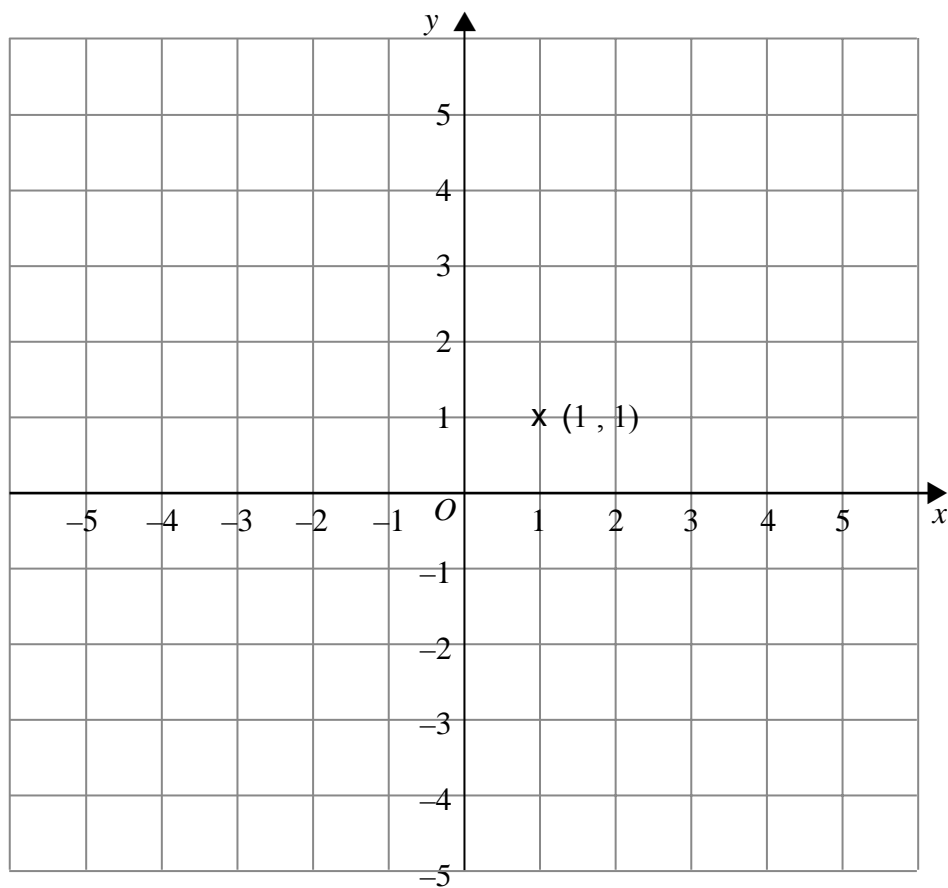
$x = \dots\dots\dots$

(2)

(Total 6 marks)



6. Show that any straight line that passes through the point $(1, 1)$ must intersect the curve with equation $x^2 + y^2 = 16$ at two points.



(Total 3 marks)



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Mathematics A

Quadratic Equations

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

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Turn over ►



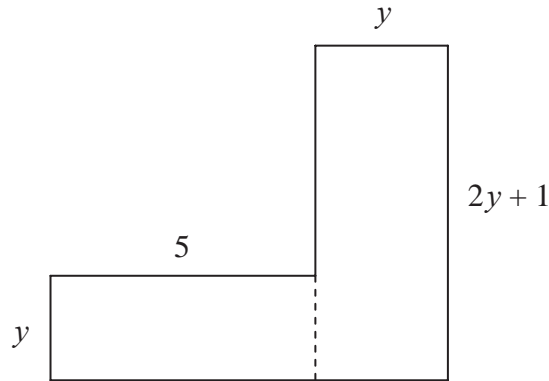
1. Simplify fully $\frac{6x^2 + x - 1}{4x^2 - 1}$

.....
(Total 4 marks)



2. The diagram below shows a 6-sided shape.
 All the corners are right angles.
 All the measurements are given in centimetres.

Diagram **NOT**
 accurately drawn



The area of the shape is 95 cm^2 .

- (a) Show that $2y^2 + 6y - 95 = 0$

(3)

- (b) Solve the equation

$$2y^2 + 6y - 95 = 0$$

Give your solutions correct to 3 significant figures.

$y = \dots\dots\dots$ or $y = \dots\dots\dots$

(3)



3. Simplify fully $\frac{x^2 - 8x + 15}{2x^2 - 7x - 15}$

.....
(Total 3 marks)



4. (a) Rearrange this equation

$$\frac{5}{x+2} = \frac{4-3x}{x-1}$$

to give $3x^2 + 7x - 13 = 0$

(3)

(b) Solve $3x^2 + 7x - 13 = 0$
correct to 2 decimal places.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$
(3)

(Total 6 marks)



5. (a) Expand and simplify $(x + 3)(x - 2)$

.....
(2)

(b) Factorise $x^2 + 7x + 10$

.....
(2)

(c) $x = 3y + 4(z - y)$

Find the value of x when $y = 6$ and $z = 5$

$x = \dots\dots\dots$
(3)

(Total 7 marks)



6. (a) Factorise $x^2 - 7x + 10$

.....
(2)

(b) Solve $x^2 - 7x + 10 = 0$

$x =$
or $x =$
(1)

(Total 3 marks)



7. (a) Simplify $4a + 3c - 2a + c$

.....
(1)

(b) $S = \frac{1}{2}at^2$

Find the value of S when $t = 3$ and $a = \frac{1}{4}$

$S =$
(2)

(c) Factorise $x^2 - 5x$

.....
(2)

(d) Expand and simplify $(x + 3)(x + 4)$

.....
(2)

(e) Factorise $y^2 + 8y + 15$

.....
(2)

(Total 9 marks)



8 (a) Simplify $(c^2 k^5)^4$

.....
(1)

(b) Expand and simplify $(3x + 5)(4x - 1)$

.....
(2)

(c) Solve $x^2 - 3x - 10 = 0$

$x =$

(Total 6 marks)



9 The plan below shows a large rectangle of length $(2x + 6)$ m and width x m.

A smaller rectangle of length x m and width 3 m is cut out and removed.

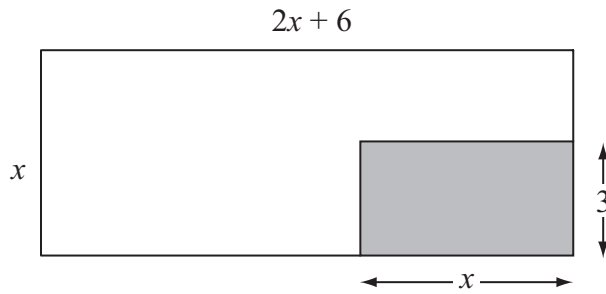


Diagram **NOT** accurately drawn

The area of the shape that is left is 100 m^2 .

(a) Show that $2x^2 + 3x - 100 = 0$

(3)

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

..... m

(4)



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Mathematics A

Questionnaires

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

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Turn over ►



(a) Match the data collection methods to **the** situations.

The first one is done for you.

Watch how people climb steps

Data Logging

Obtain opinions on school dinners

Observation

Collect data on pulse rate after exercise

Experiment

Record number of people entering and leaving a building

Questionnaire

(2)

Design a questionnaire to find out the age and gender of some people.

Write **two** questions. You should include some response boxes.

. Question 1

Question 2

(4)



2. Peter wants to find out how much people spend on their lunch. He uses this question on a questionnaire.

How much do you spend on your lunch?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
£1–£5	£5–£10	£10–£15

(a) Write down **two** things that are wrong with this question.

1

.....

2

.....

(2)

(b) Design a better question for his questionnaire to find out how much people spend on their lunch.
You should include some response boxes.

(2)

(Total 4 marks)



3. Ron is going to take a survey of the games played by students.

He wants to design a questionnaire.

- (a) Design a suitable question that he could use to find out what types of game students play.

(2)

Ron put the question below on his questionnaire.

‘How many games have you played?’

A few

A lot

- (b) Design a better question.
You should include some response boxes.

(2)

(Total 4 marks)



4. Georgina wants to find out how often adults go to the library. She uses this question on a questionnaire.

“How many times do you go to the library?”

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not very often	Sometimes	A lot

- (a) Write down **two** things wrong with this question.

1

.....

2

.....

(2)

- (b) Design a better question for her questionnaire to find out how often adults go to the library.
You should include some response boxes.

(2)

(Total 4 marks)



5. Will wants to find out how many tunes people download.

He uses this question on a questionnaire.

How many tunes do you download?

1 – 5

5 – 10

10 – 15

15 – 20

Write down **two** different things wrong with this question.

1

.....

2

.....

(Total 2 marks)



6. Sophie wants to find out the amount of time people listen to music. She will use a questionnaire.

(a) Design a suitable question for Sophie to use in her questionnaire. You must include some response boxes.

(2)

Sophie asks the people at a concert to complete her questionnaire. This may **not** be a suitable sample.

(b) Give a reason why.

.....
.....

(1)

(Total 3 marks)



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Mathematics A

Scatter Graphs

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

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Turn over ►



1. (a) Andy, Lauren and Noah are playing with a normal fair dice. They each predict the next seven throws.

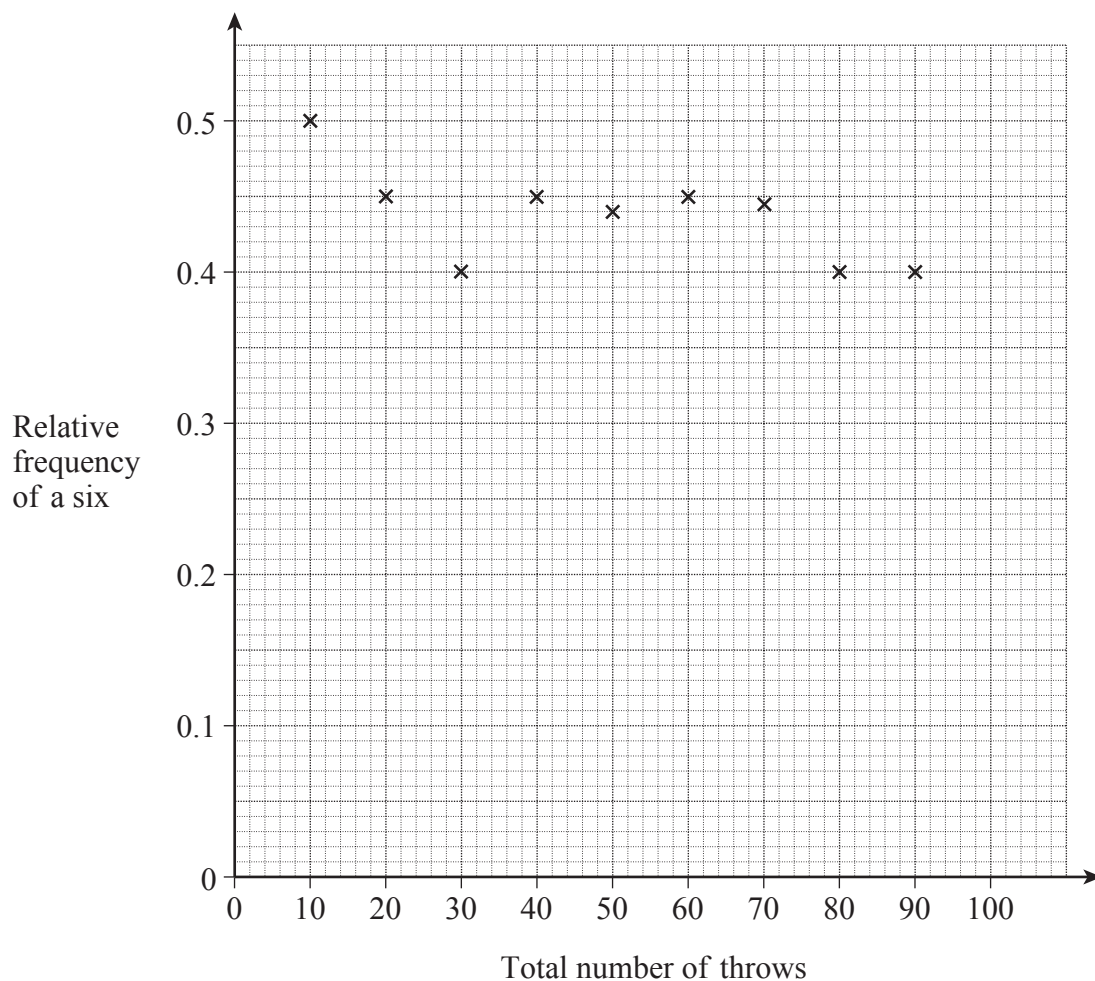
Andy	1	2	1	2	1	2	1
Lauren	3	5	2	2	4	6	1
Noah	4	4	4	4	4	4	4

Which, if any, of these predictions is the most likely? Circle your choice and explain your answer.

Andy Lauren Noah All are equally likely

(2)

- (b) Nikki makes a six-sided dice.
To test the dice she throws it 100 times.
After each 10 throws she records the number of sixes thrown.
The relative frequencies for the first 90 throws are shown on the graph.



(b) (i) How many sixes were there in the first 10 throws?

(1)

(ii) After 100 throws there were 42 sixes.

Calculate and plot the relative frequency of a six after 100 throws.

(iii) How many sixes would you expect to get after 100 throws of a **fair** dice?

(1)

(iv) Is Nikki's dice fair?

(1)

Tick the correct box.

Yes

No

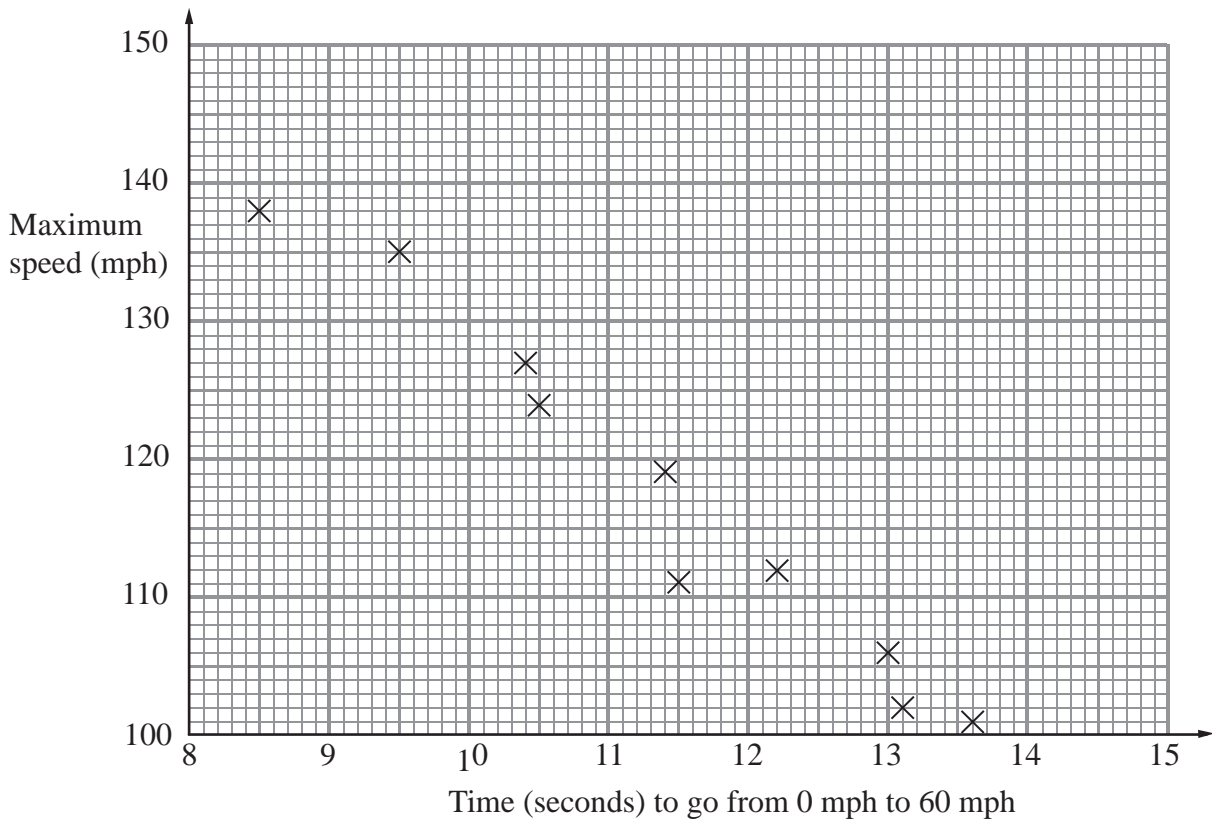
Give a reason for your answer.

(1)

(Total 6 marks)



2. The scatter graph shows some information about 10 cars.
 It shows the time, in seconds, it takes each car to go from 0 mph to 60 mph.
 For each car, it also shows the maximum speed, in mph.



- (a) What type of correlation does this scatter graph show?

.....
 (1)

The time a car takes to go from 0 mph to 60 mph is 11 seconds.

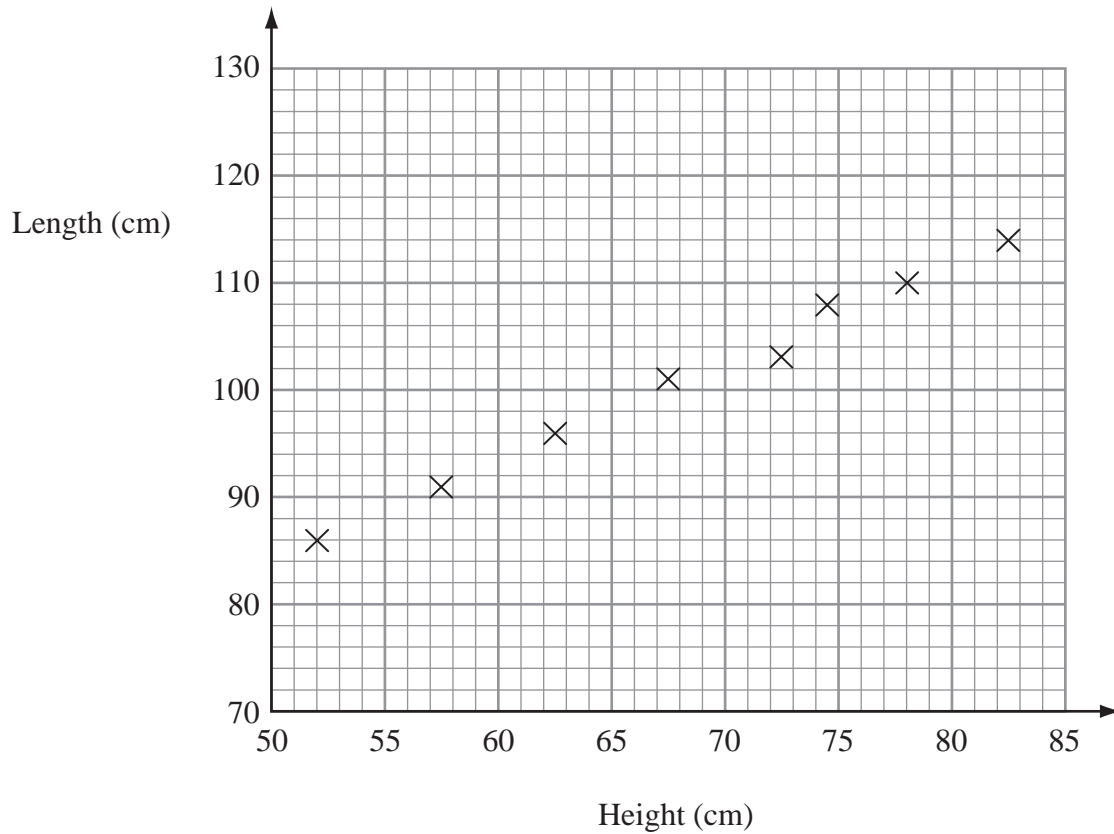
- (b) Estimate the maximum speed for this car.

..... mph
 (2)

(Total 3 marks)



3. The scatter graph shows information about eight dogs. It shows the height and the length of each dog.



The table gives the height and the length of two more dog.

Height (cm)	65	80
Length (cm)	100	110

- (a) On the scatter graph, plot the information from the table. (1)

- (b) Describe the relationship between the height and the length of these dog.
 (1)

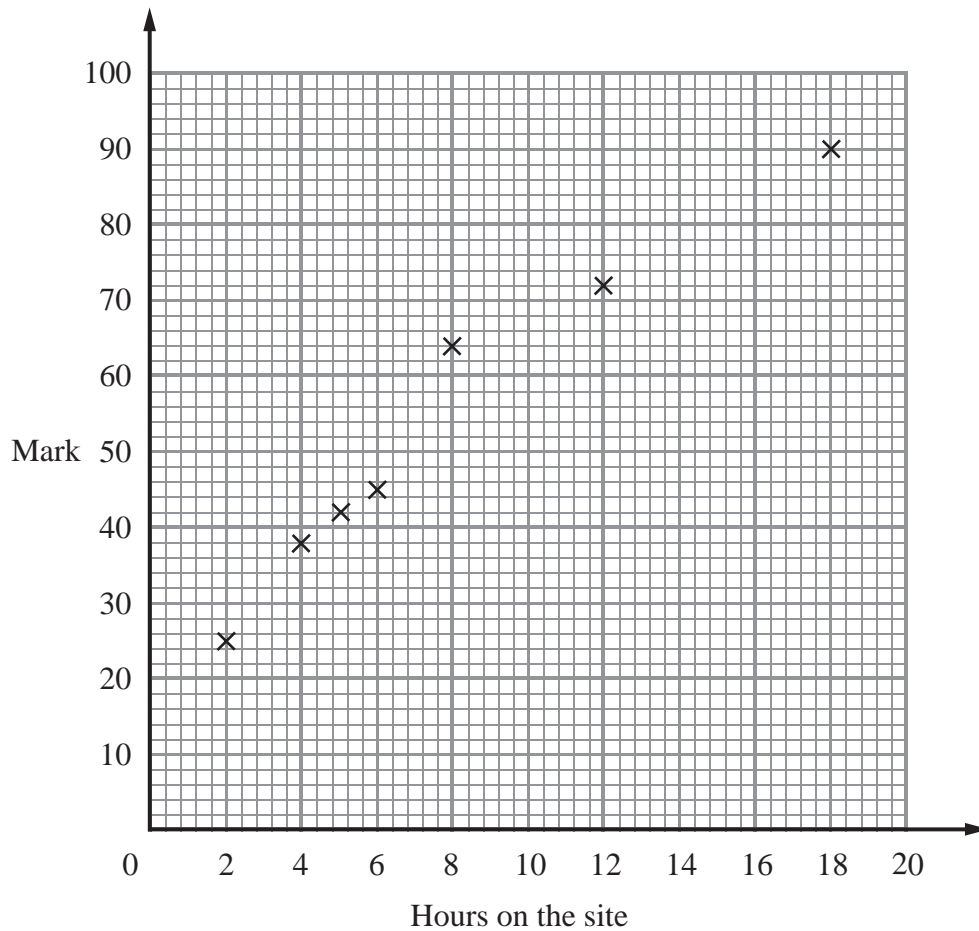
The height of a dog is 76 cm.

- (c) Estimate the length of this dog.
cm (2)

(Total 4 marks)



4. Some students revised for a mathematics exam. They used a private tutor. The scatter graph shows the times seven students spent with the tutor and the marks the students got in the mathematics exam.



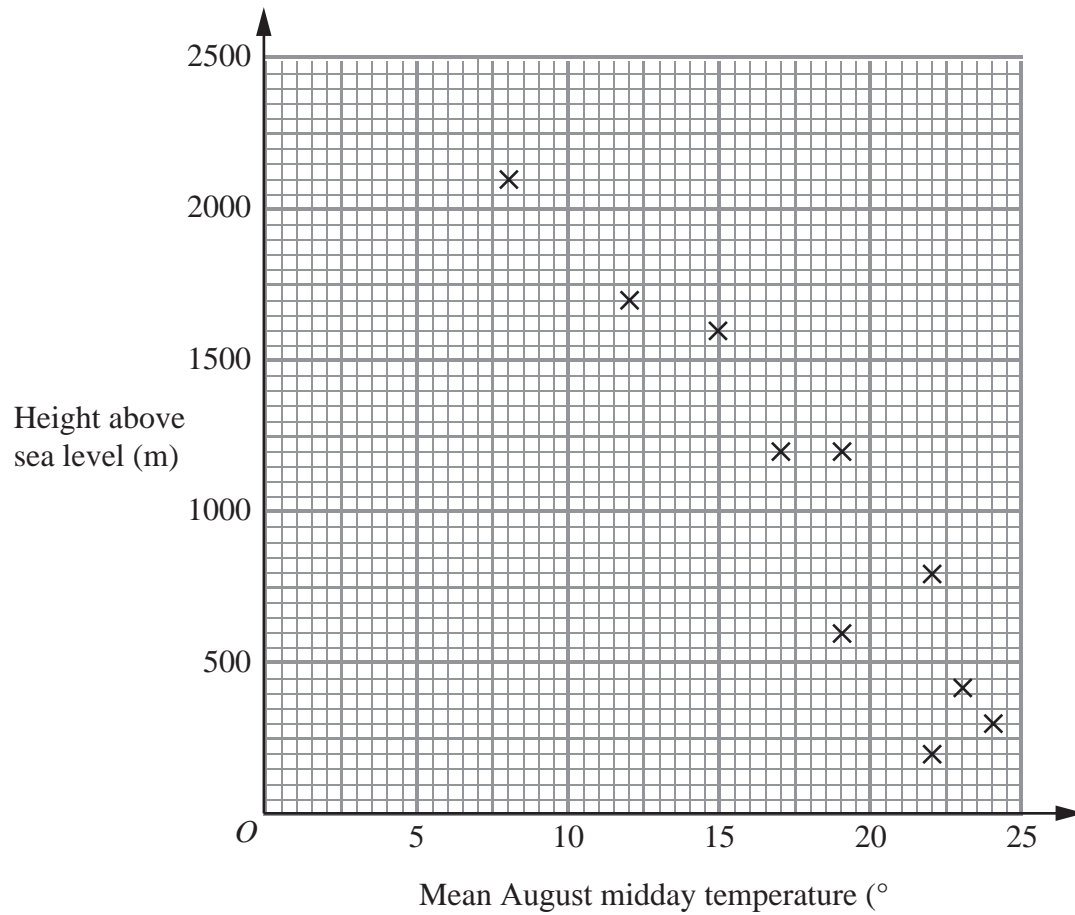
Here is the information for 3 more students.

Hours with tutor	7	10	16
Mark	50	56	78

- (a) Plot this information on the scatter graph. (1)
- (b) What type of correlation does this scatter graph show?
 (1)
- (c) Draw a line of best fit on the scatter graph. (1)



5. The scatter graph shows information for some weather stations. It shows the height of each weather station above sea level (m) and the mean August midday temperature ($^{\circ}\text{C}$) for that weather station.



C) The table shows this information for two more weather stations.

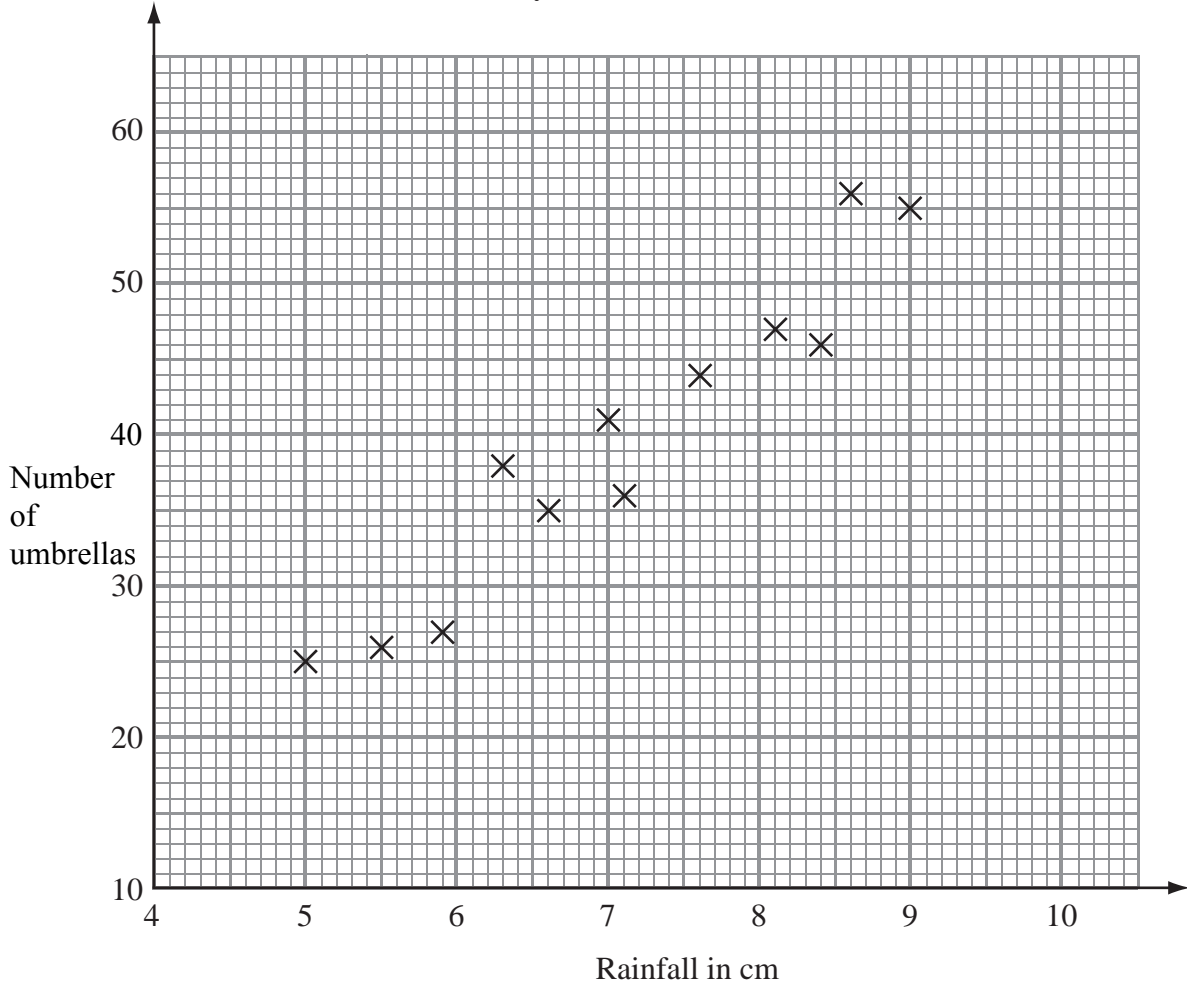
Height of weather station above sea level (m)	1000	500
Mean August midday temperature ($^{\circ}\text{C}$)	20	22

- (a) Plot this information on the scatter graph. (1)
- (b) What type of correlation does this scatter graph show?

- (1)
- (c) Draw a line of best fit on the scatter graph. (1)



6. Mr Davies sells umbrellas.
 The scatter graph shows some information about the number of umbrellas he sold and the rainfall, in cm, each month last year.



In January of this year, the rainfall was 6.1 cm.

During January, Mr Davies sold 33 umbrellas.

(a) Show this information on the scatter graph.

(1)

(b) What type of correlation does this scatter graph show?

..... (1)

In February of this year, Mr Davies sold 39 umbrellas.

(c) Estimate the rainfall for February.

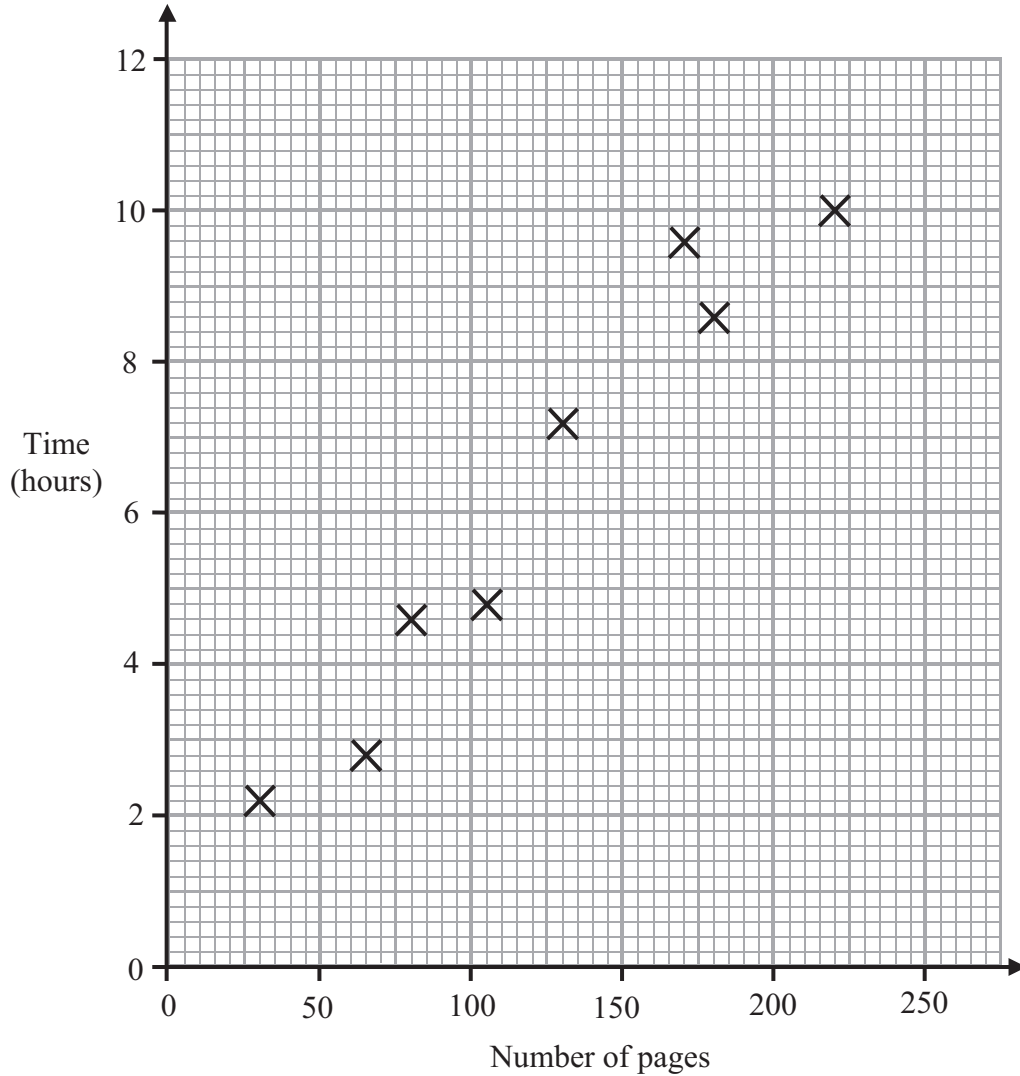
..... cm (2)



7. Sophie reads eight books.

For each book she recorded the number of pages and the time she takes to read it.

The scatter graph shows information about her results.



(a) Describe the relationship between the number of pages in a book and the time Sophie takes to read it.

.....
(1)

Sophie reads another book.
The book has 200 pages.

(b) Estimate the time it takes Sophie to read it.

..... hours
(2)

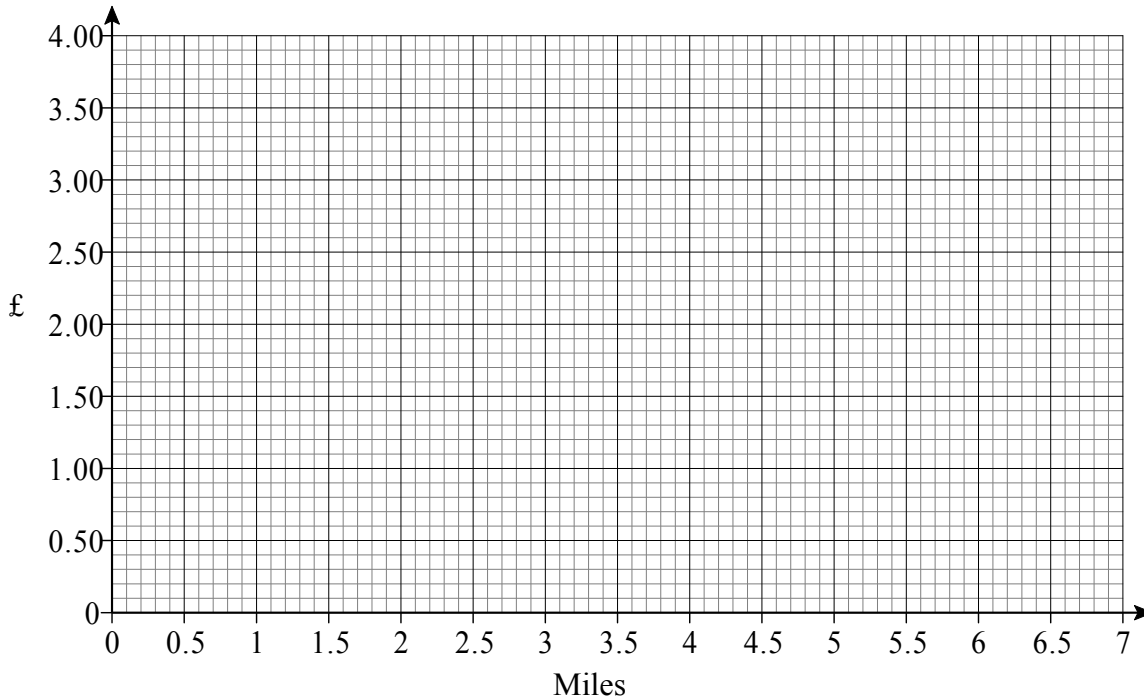
(Total 3 marks)



8. The table shows the cost and length of different tram journeys across a city.

Length of journey (miles)	1.8	2.1	2.2	2.5	3.2	3.7	4.0	4.6	5.8	6.4
Cost of journey (£)	0.90	0.80	1.50	1.60	2.00	2.20	2.40	2.90	3.10	3.40

(a) Draw a scatter diagram for the data on the grid below.



(b) Estimate the cost of tram journey of length 5 miles.
Give your answer to the nearest ten pence.

(2)

.....

£

(2)



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Mathematics A

Sequences

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

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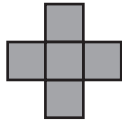
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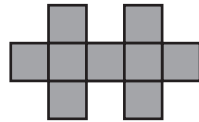
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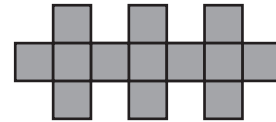
1. Here are some patterns made from squares.



Pattern number 1

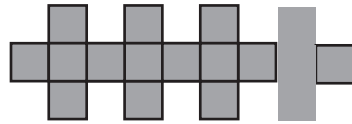


Pattern number 2

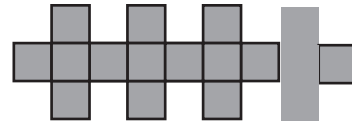


Pattern number 3

(a) The diagram below shows part of Pattern number 5
Complete the diagram for Pattern number 5



Pattern number 4



Pattern number 5

(1)

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of squares	5	9	13		

(1)

(c) Find the number of squares used for Pattern number 12

.....
(1)

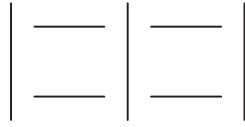
(Total 3 marks)



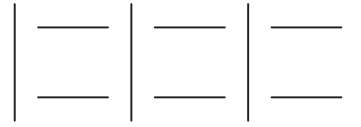
2. Here are some patterns made using sticks.



Pattern number 1



Pattern number 2



Pattern number 3

(a) In the space below, complete Pattern number 4.

Pattern number 4

(1)

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of sticks	4	7	10		

(1)

(c) How many sticks are used in Pattern number 10?

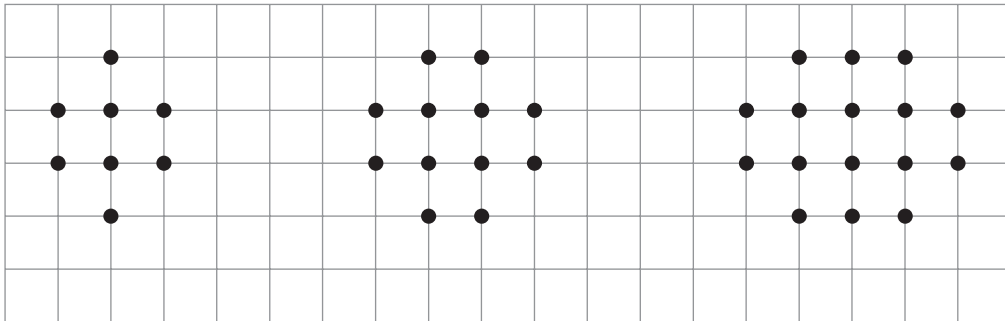
.....

(1)

(Total 3 marks)



3. Here are some patterns made with dots.

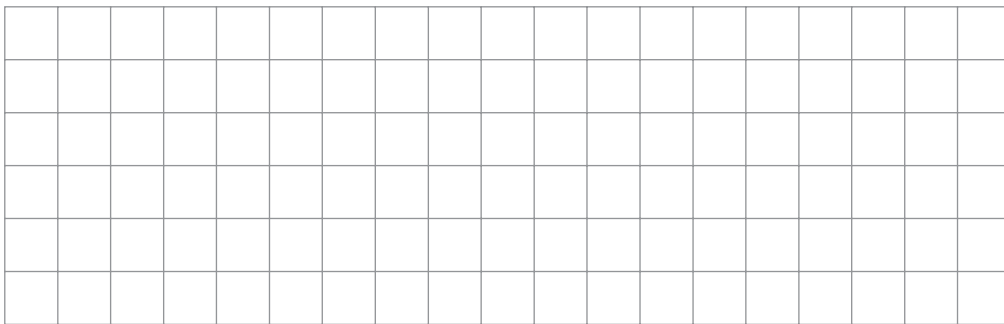


Pattern number 1

Pattern number 2

Pattern number 3

(a) In the space below, draw Pattern number 4



Pattern number 4

(1)

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of dots	8	12	16		

(2)

(Total 3 marks)



4. The first even number is 2

(a) Write down the 4th even number.

.....
(1)

Here are some patterns made from sticks.



Pattern number 1



Pattern number 2



Pattern number 3

(b) Draw Pattern number 4

Pattern number 4

(1)

(c) Complete the table.

Pattern number	1	2	3	4	5
Number of sticks	3	6	9		

(2)

Jenny wants to find the number of sticks in Pattern number 100

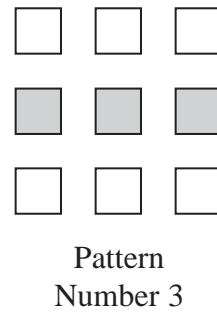
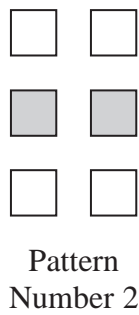
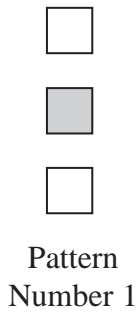
(d) Write down a method she could use.

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

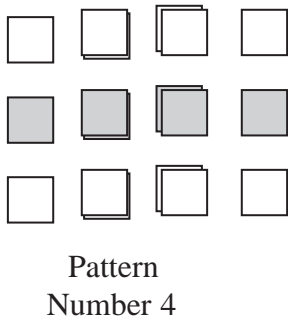
(Total 5 marks)



5. Here is a sequence of patterns made from grey squares and white squares.



(a) Complete Pattern Number 5



Pattern
Number 5

(1)

(b) Complete the table.

Pattern Number	1	2	3	4	5
Total number of squares	3	6	9		

(1)

One of the patterns in the sequence has 10 grey squares.

(c) How many white squares does this pattern have?

.....
(1)

Another pattern in the sequence has a total of 18 squares.

(d) How many grey squares does the pattern have?

.....
(1)

(Total 4 marks)



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

5 9 13 17

(a) (i) Write down the next term of the number sequence.

(ii) Explain how you found your answer.

.....

.....
(2)

The 24th term of the number sequence is 97

(b) Work out the 25th term of the number sequence.

.....
(1)

(Total 3 marks)



7. The n th term of a number sequence is given by $3n + 1$

(a) Work out the first **three** terms of the number sequence.

.....
(1)

Here are the first four terms of another number sequence.

1 5 9 13

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

.....
(2)

(Total 3 marks)



8. Write down the next term in each sequence.

(a)(i) 5 8 11 14

.....

(1)

(a)(ii) 6 4 2 0

.....

(1)

(a)(iii) 2 4 8 16

.....

(1)

(b) The numbers in this sequence increase by the same amount each time.

11 35

What are the missing numbers?

.....

.....and.....

(2)



9. The n th term of a sequence is $100 - 3n$.

(a) Work out the first three terms.

.....

(2)

(b) Work out the first term of the sequence that is negative.

.....

(2)



10. (a) Here are the first three terms of a sequence.

12 8 6

The rule for working out the next term in the sequence is

Add 4 to the previous term and then divide by 2

Work out the first term that is **not** a whole number.

.....

(2)

(b) This sequence uses the same rule.

Add 4 to the previous term and then divide by 2

The third term of this sequence is 9.

..... 9

Work out the first term.

.....

(3)



11. (a) Write down the next term of each sequence.

(a) (i) 3 8 13 18

.....
(1)

(a) (ii) 5.1 5.3 5.5 5.7

.....
(1)

(a) (iii) 2 -1 -4 -7.....

.....
(1)

(b) Here is a different sequence.
The third term is 20 and the fourth term is 36.

..... 20 36

The term to term rule for this sequence is

Double and subtract four

Work out the first term of the sequence.

.....
(2)



12.(a) The numbers in this sequence decrease by the same amount each time.

74 58 50 42

What are the **two** missing numbers?

..... and

(b) The numbers in this different sequence decrease by the same amount each time. (2)

26 6

What are the **three** missing numbers?

..... , ,

(2)



13.(a) Here are the first two terms of a sequence.

5 4

The rule for finding the next term in the sequence is

Multiply the previous term by 2 and subtract 6

Work out the first negative term of the sequence.

(2)

(b) Here are the first three terms of another sequence.

1 4 7

Which of the following is the n th term for this sequence? Circle the correct answer.

$n + 3$ $3n + 1$ $3n - 2$ $3n + 2$

(1)



14. (a) A sequence starts

49 46 43 40

(a) (i) Write down the next two terms.

..... and

(2)

(a) (ii) What is the rule for continuing the sequence?

.....

(b) Another sequence starts

(1)

57 50 43 36

This sequence is continued.

What is the first negative number in this sequence?

.....

(c) The first sequence is also continued.

(1)

The two sequences have the number 43 in common.

What is the next number that the two sequences have in common?

.....

(2)



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Mathematics A

Simultaneous Equations

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators must not be used.**



Information

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- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
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Advice

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Turn over ►



1. Solve the simultaneous equations

$$3x + 2y = 8$$

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

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

(Total 4 marks)



2. Solve the simultaneous equations

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

$$4x - 3y = 11$$

$x = \dots\dots\dots$, $y = \dots\dots\dots$

(Total 4 marks)



3. Solve the simultaneous equations

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

$$y = 3x + 1$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$\text{or } x = \dots\dots\dots y = \dots\dots\dots$$

(Total 6 marks)



4. Solve the simultaneous equations

$$4x + y = -1$$

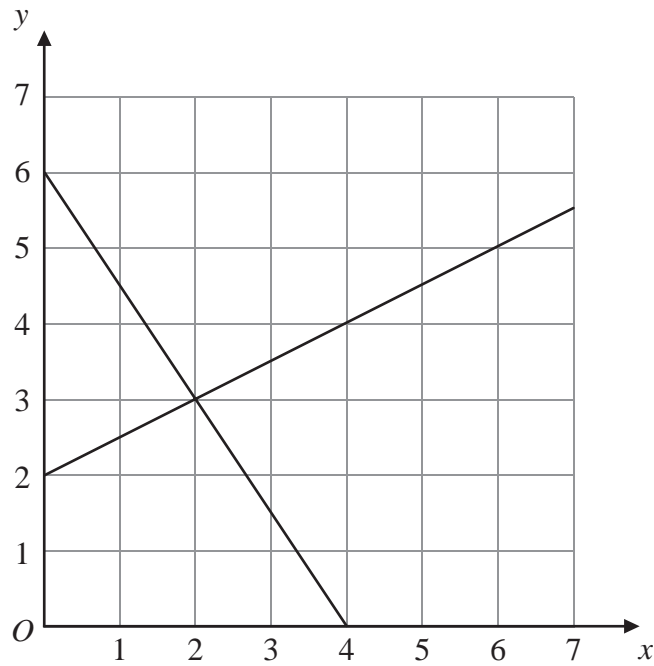
$$4x - 3y = 7$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

(Total 3 marks)



5.



The diagram shows graphs of $y = \frac{1}{2}x + 2$

and $2y + 3x = 12$

(a) Use the diagram to solve the simultaneous equations

$$y = \frac{1}{2}x + 2$$

$$2y + 3x = 12$$

$x = \dots\dots\dots$ $y = \dots\dots\dots$
(1)

(b) Find an equation of the straight line which is parallel to the line $y = \frac{1}{2}x + 2$ and passes through the point (0, 4).

$\dots\dots\dots$
(2)

(Total 3 marks)



8. Solve the simultaneous equations

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

$$4x - 3y = 11$$

$x = \dots\dots\dots, y = \dots\dots\dots$

(Total 4 marks)



9. Solve the simultaneous equations

$$4x + y = 10$$

$$2x - 3y = 19$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

(Total 3 marks)



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Mathematics A

Surds and Indices

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

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- Check your answers if you have time at the end.

Turn over ►



1. Work out $(2 + \sqrt{5})(2 - \sqrt{5})$

Give your answer in its simplest form.

.....
(1)

2. (a) Write down the value of $64^{\frac{1}{2}}$

.....
(1)

(b) Write $\sqrt{45}$ in the form $k\sqrt{5}$, where k is an integer.

.....
(1)

(Total 3 marks)



3. Find the value of

(i) 8^0

.....

(ii) $64^{\frac{1}{2}}$

.....

(iii) $\left(\frac{27}{8}\right)^{\frac{2}{3}}$

.....

(Total 4 marks)



4. (a) Simplify $4x \times 5y$

.....
(1)

(b) Simplify $x \times x \times x \times x$

.....
(1)

(c) Expand $4(3n - 7)$

.....
(2)

(d) Expand and simplify $2(2x + 3) + 3(x + 1)$

.....
(2)

(e) Simplify $n^2 \times n$

.....
(1)

(f) Simplify $p^5 \div p^3$

.....
(1)

(Total 8 marks)



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

.....
(1)

(b) Simplify $r^5 \div r^2$

.....
(1)

(c) Simplify $12tv^6 \div 6tv^5$

.....
(2)

(d) Simplify $(9w^2y^6)^{\frac{1}{2}}$

.....
(2)

(e) For $y > 1$, write the following expressions in order of size.
Start with the expression with the least value.

$$y^0 \quad y^2 \quad y \quad y^{-2} \quad y^{\frac{1}{2}}$$

.....

(2)

(Total 8 marks)



6. (a) Simplify $n^3 \times n^4$

.....
(1)

(b) Simplify $q^7 \div q^3$

.....
(1)

(c) Simplify $a^2b^3 \times 3ab^2$

.....
(2)

(Total 4 marks)

7. (a) Expand and simplify $3(a + 4) + 5(2a + 1)$

.....
(2)

(b) Simplify $x^4 \times x^6$

.....
(1)

(c) Simplify $y^8 \div y^5$

.....
(1)

(d) Simplify $(z^4)^3$

.....
(1)

(Total 5 marks)



8. (a) Simplify $v^6 \times v^2$

.....
(1)

(b) Simplify $\frac{m^8}{m^3}$

.....
(1)

(c) Simplify $(2y)^3$

.....
(2)

(d) Simplify $3a^2h \times 4a^5h^4$

.....
(2)

(Total 6 marks)



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Mathematics A

Transformations

Foundation Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks



Instructions

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- Answer the questions in the spaces provided
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Advice

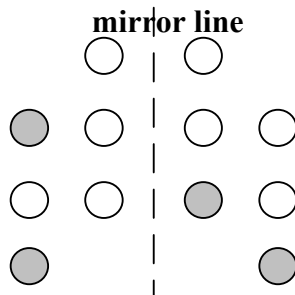
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►



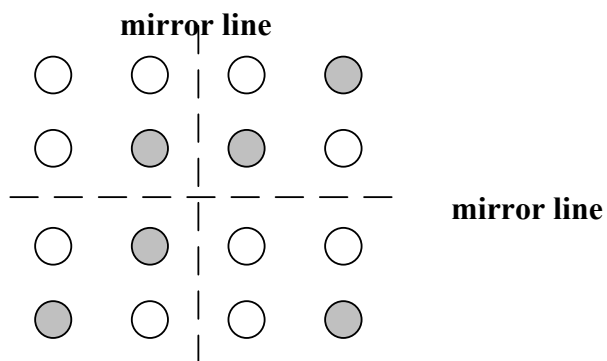
1. Here are some patterns of circles.

(a) Shade **two** more circles to give this pattern symmetry in the mirror line.



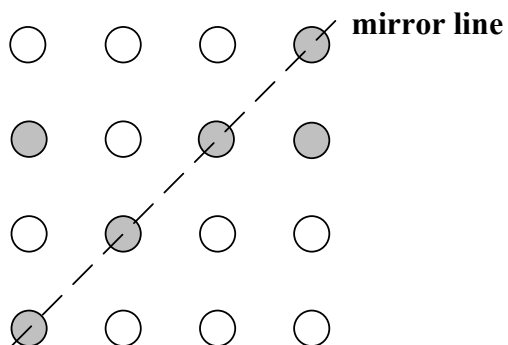
(2)

(b) Shade **two** more circles to give this pattern symmetry in both mirror lines.



(2)

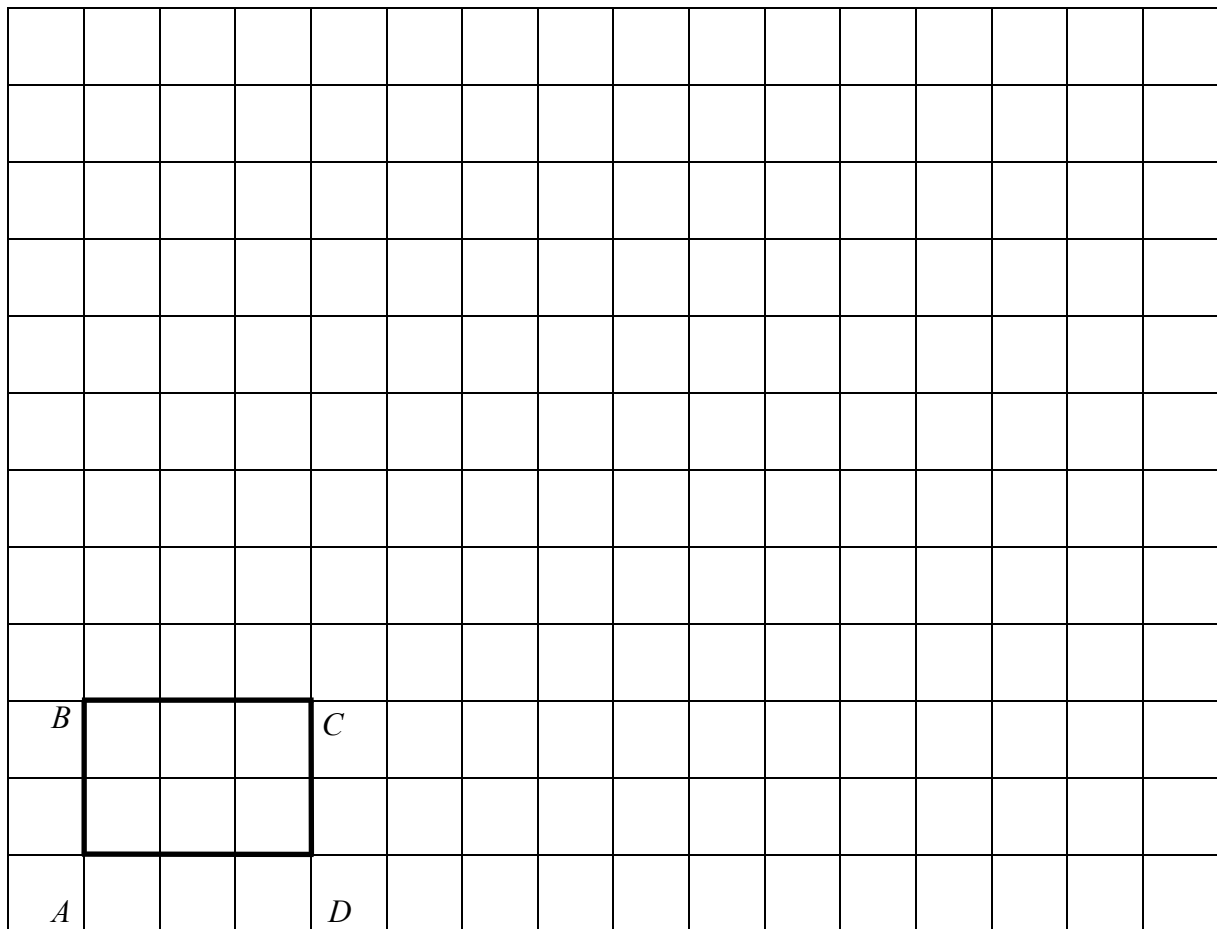
(c) Shade **four** more circles to give this pattern symmetry in the mirror line.



(2)



2. The shape $ABCD$ is drawn on a grid.



(a) Enlarge $ABCD$ by scale factor 3. (2)

(b) How many times bigger is the area of the enlarged shape than the area of $ABCD$?

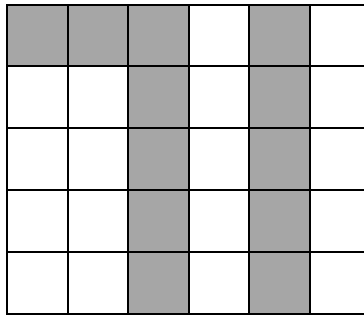
.....

(2)



3.

The number 71 is shaded on the grid.



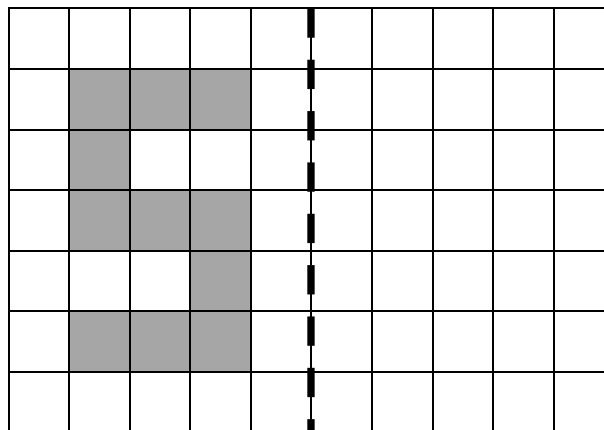
(a) What fraction of the grid is shaded?

Give your answer in its simplest form.

.....

(b) The letter S is shaded on this grid.

(3)



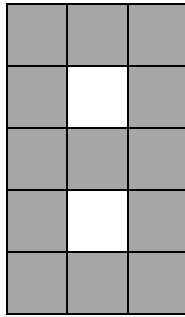
mirror line

Draw the reflection of the letter S in the mirror line.

(2)



3. (c) The number eight is drawn.



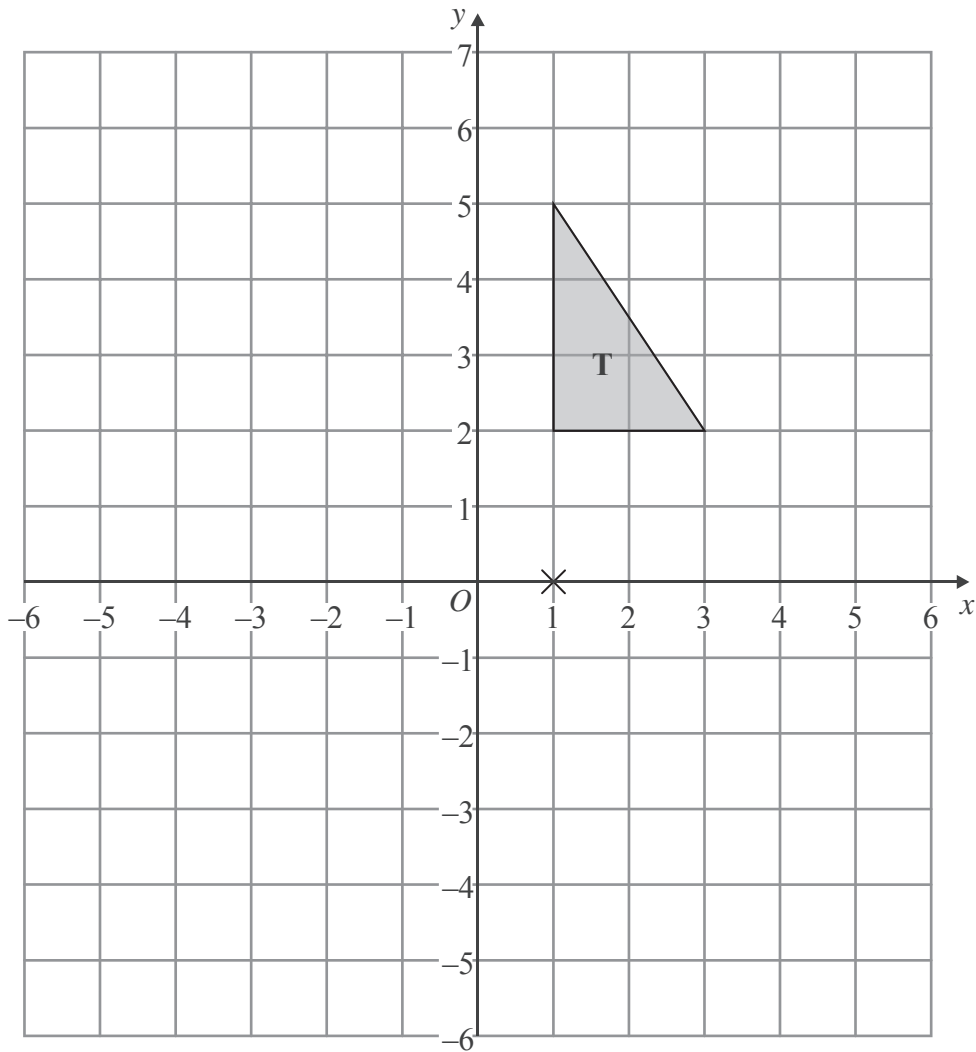
Write down the order of rotational symmetry.

.....

(1)



4.



Triangle **T** has been drawn on the grid.

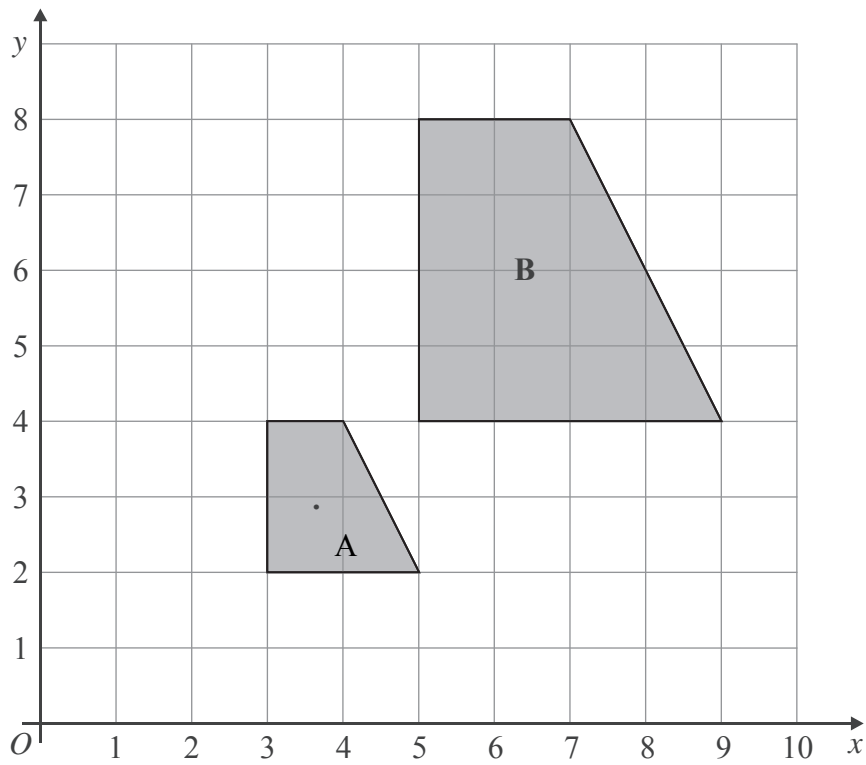
Rotate triangle **T** 90° about the point (1, 0).

Label the new triangle **A**.

(Total 2 marks)



5.



Describe fully the single transformation which maps shape **A** onto shape **B**.

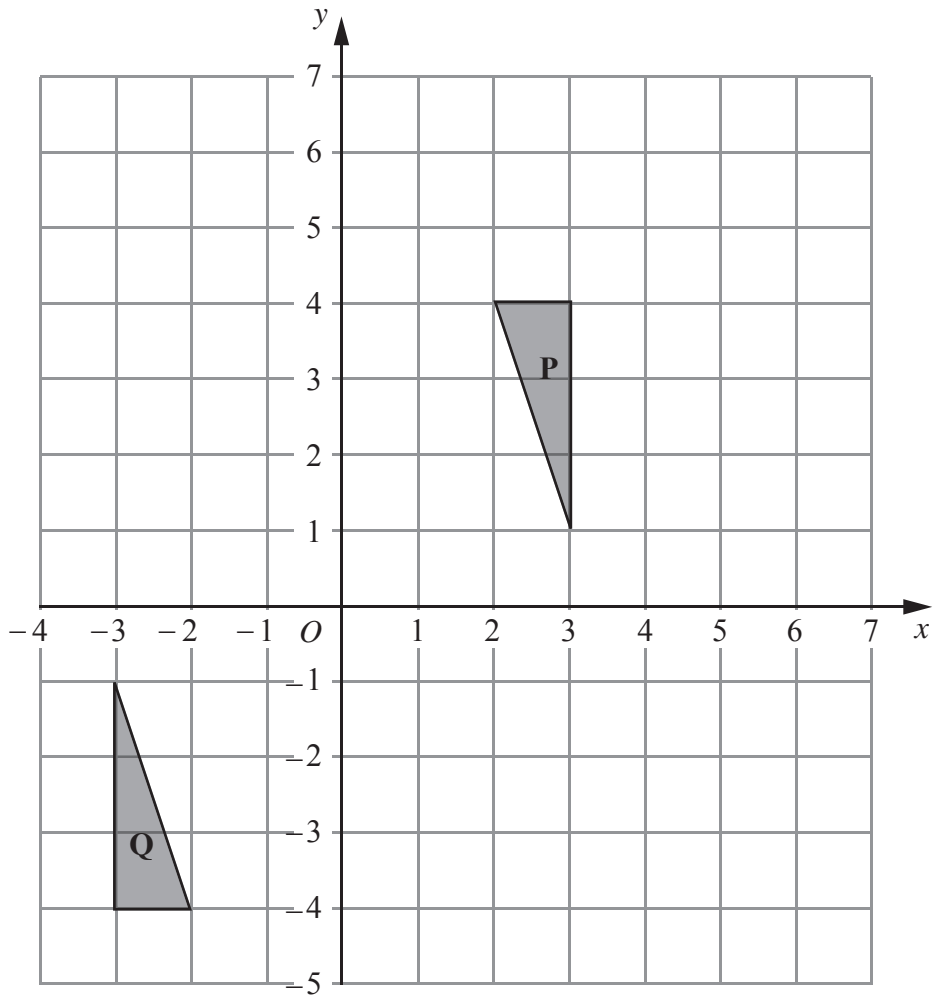
.....

.....

(Total 3 marks)



6.



Triangle **P** and triangle **Q** are drawn on the grid.

(a) Describe fully the single transformation which maps triangle **P** onto triangle **Q**.

.....
.....

(3)

(b) Translate triangle **P** by the vector $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$.

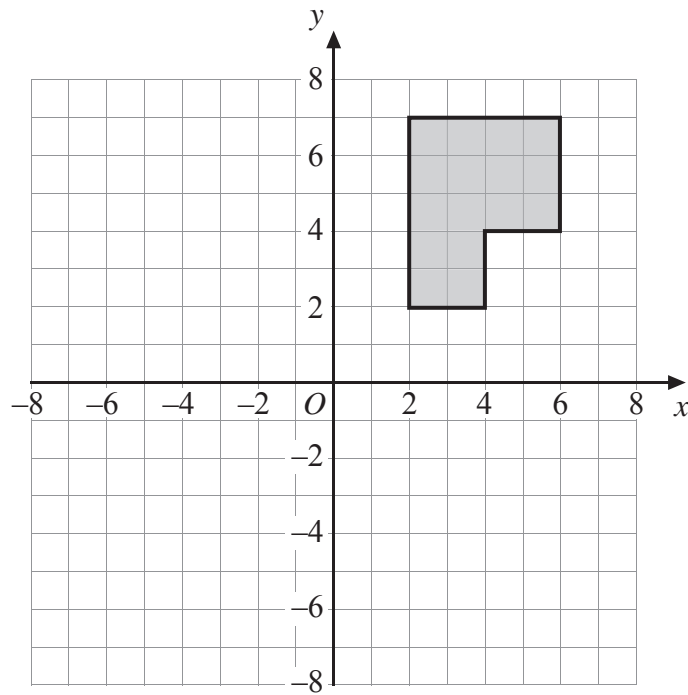
Label the new triangle **R**.

(1)

(Total 4 marks)

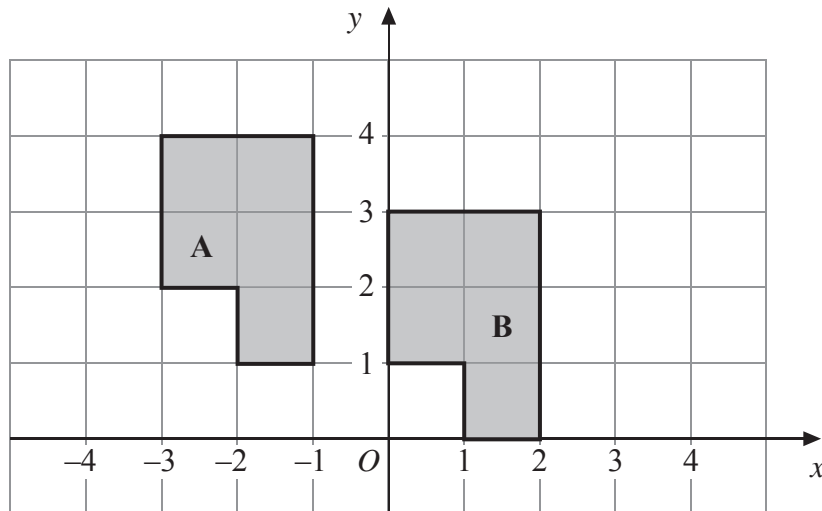


7.



(a) Rotate the shaded shape 180° clockwise about the point O .

(2)



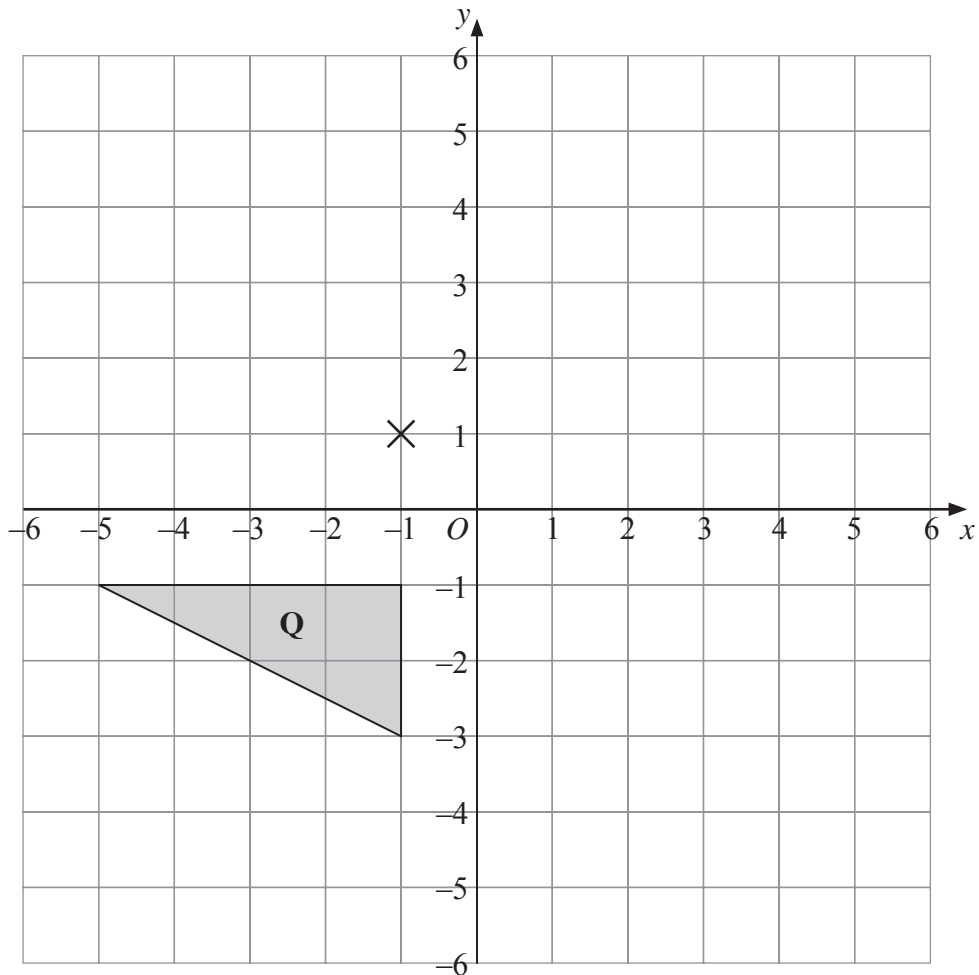
(b) Describe fully the single transformation that will map shape **A** onto shape **B**.

.....
(2)

(Total 4 marks)



9.



(a) Rotate triangle **Q** 180° about the point $(-1, 1)$.

Label the new triangle **A**.

(2)

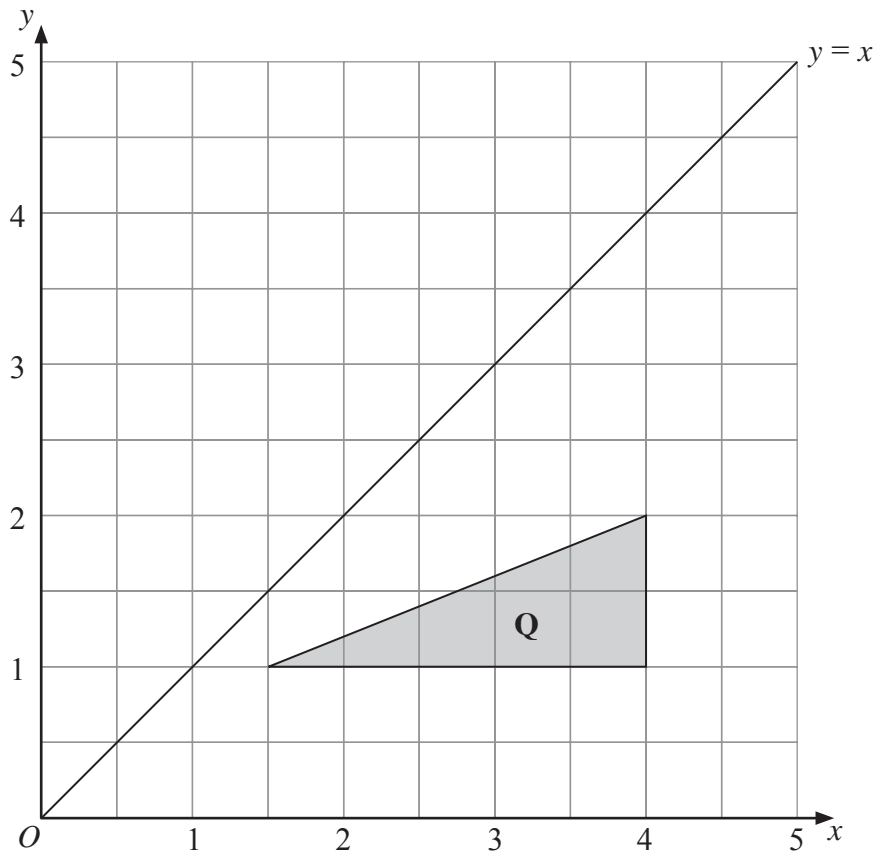
(b) Translate triangle **Q** by the vector $\begin{pmatrix} 6 \\ -1 \end{pmatrix}$.

Label the new triangle **B**.

(1)



10.



(c) Reflect triangle **Q** in the line $y = x$.

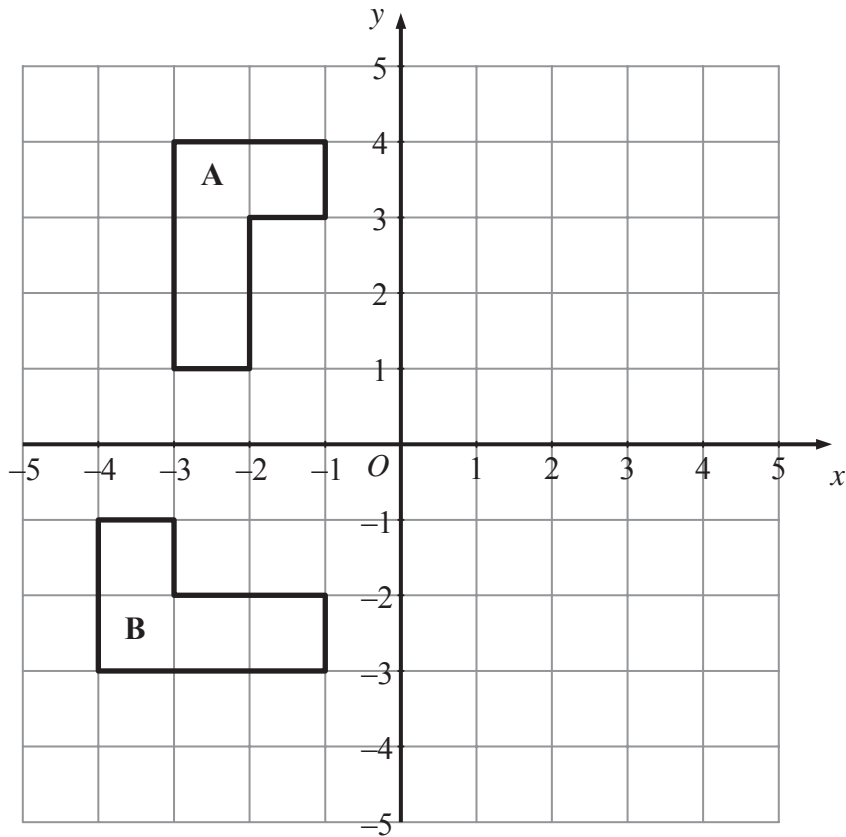
Label the new triangle **C**.

(2)

(Total 5 marks)



11.



(a) Reflect shape A in the y axis.

(2)

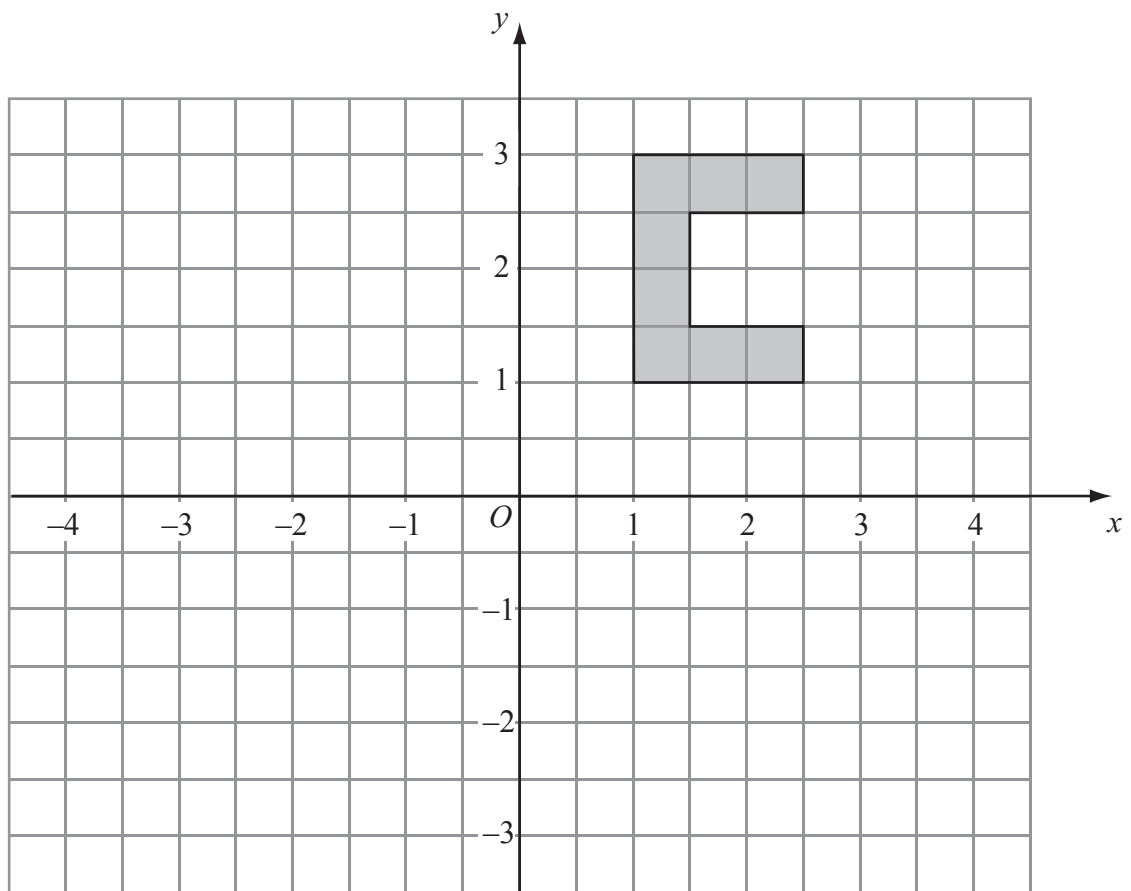
(b) Describe fully the **single** transformation which takes shape A to shape B.

.....
(3)

(Total 5 marks)



12.

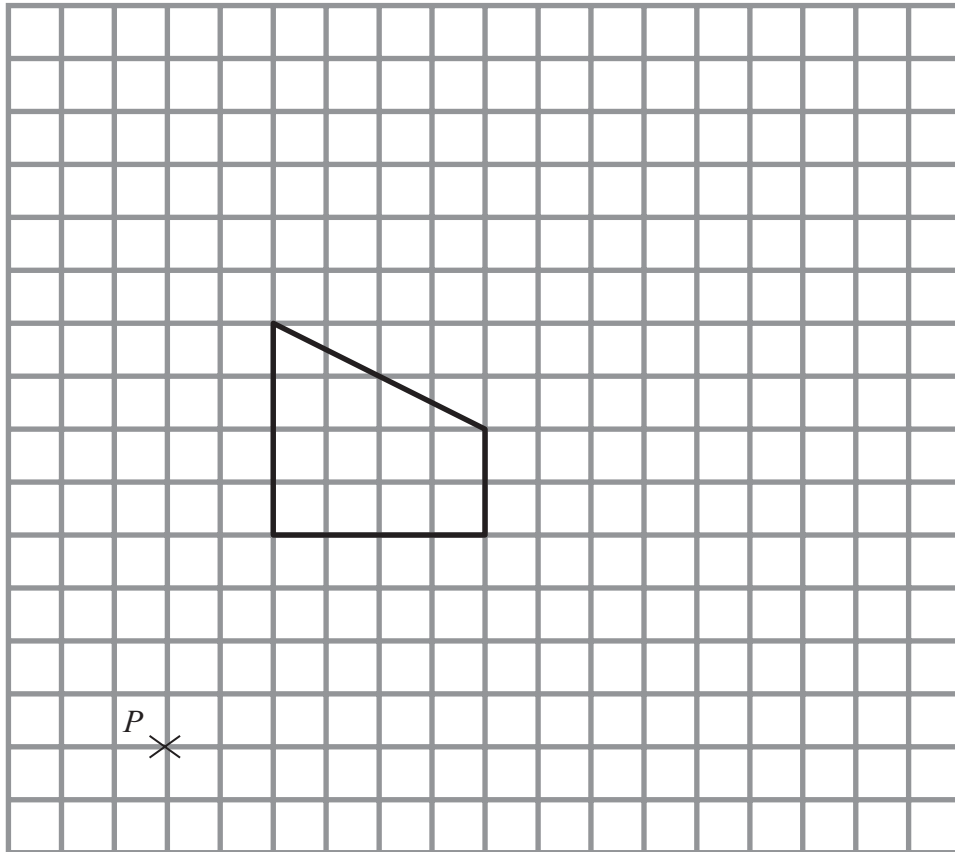


Rotate the shape 180° centre O .

(Total 2 marks)



13.

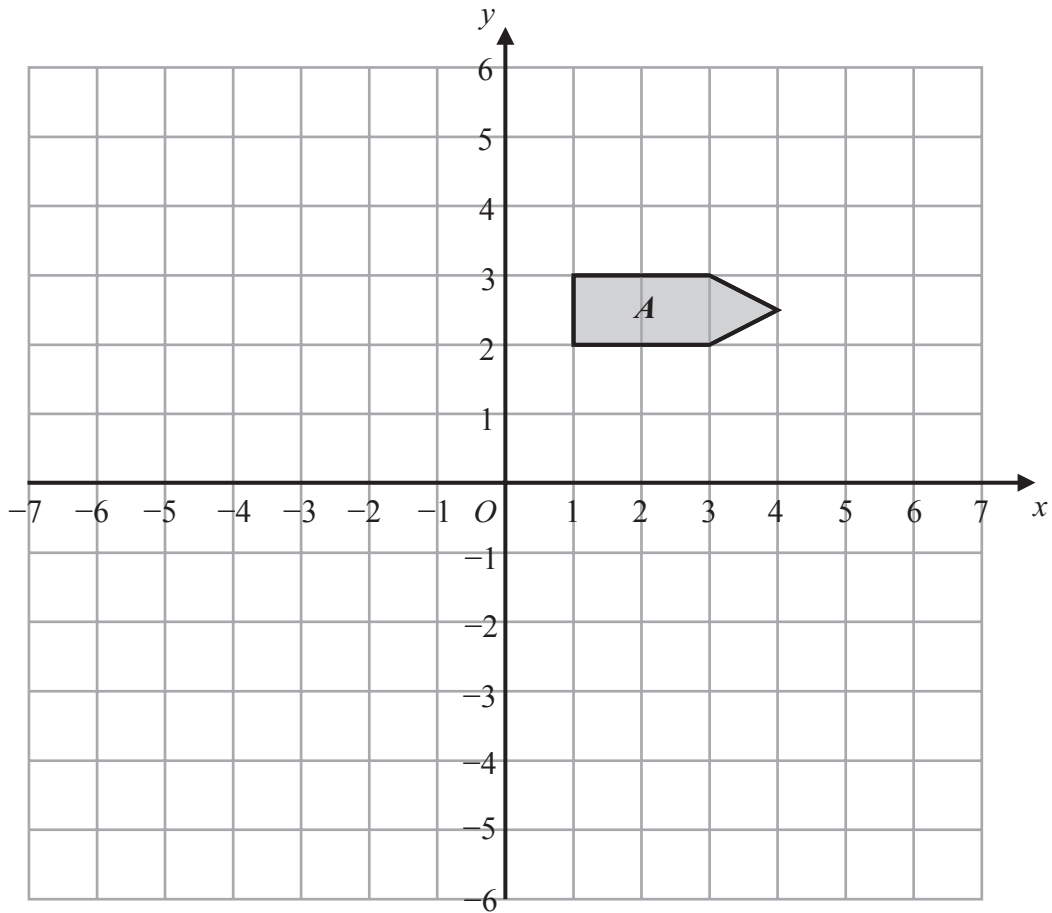


On the grid, enlarge the shape with a scale factor of $\frac{1}{2}$, centre P .

(Total 3 marks)

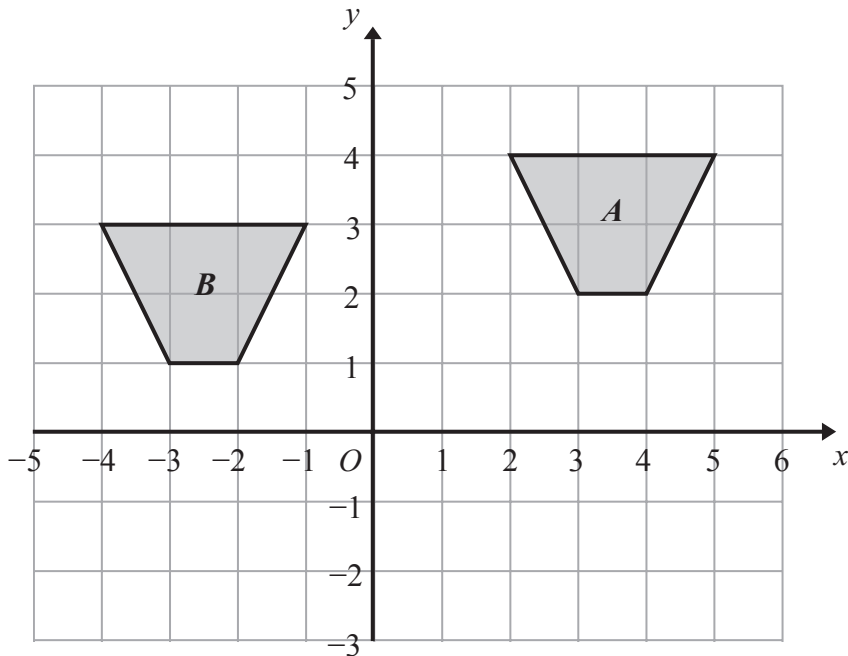


14.



(a) On the grid above, reflect shape *A* in the line $x = -2$

(2)



(b) Describe fully the single transformation that will map shape *A* onto shape *B*.

.....
.....

(2)

(Total 4 marks)



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Mathematics A

Transformation of Curves

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
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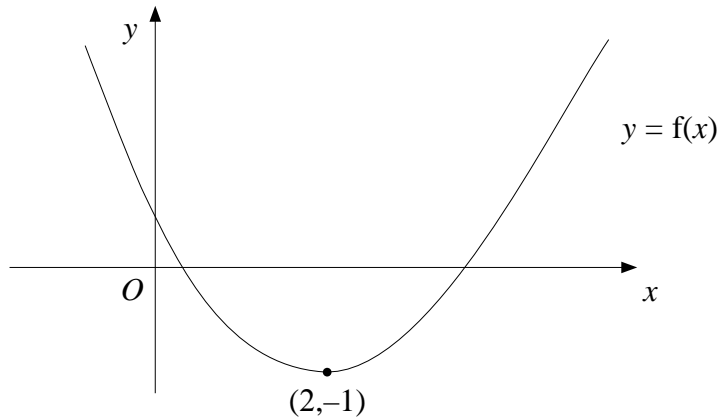
Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
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Turn over ►



1.



The diagram shows part of the curve with equation $y = f(x)$

The minimum point of the curve is at $(2, -1)$

(a) Write down the coordinates of the minimum point of the curve with equation

(i) $y = f(x - 2)$

.....

(ii) $y = 2f(x)$

.....

(iii) $y = f(2x)$

.....

(3)

The curve $y = f(x)$ is reflected in the y axis.

(b) Find the equation of the curve following this transformation.

$y =$ **(1)**

The curve with equation $y = f(x)$ has been transformed to give the curve with equation $y = f(x) + 2$

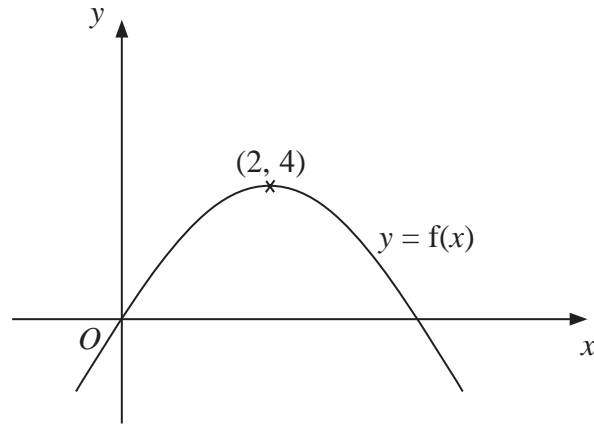
(c) Describe the transformation.

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

(Total 5 marks)



2.



The diagram shows part of the curve with equation $y = f(x)$.
The coordinates of the maximum point of this curve are (2, 3).

Write down the coordinates of the maximum point of the curve with equation

(a) $y = f(x - 2)$

(..... ,)
(1)

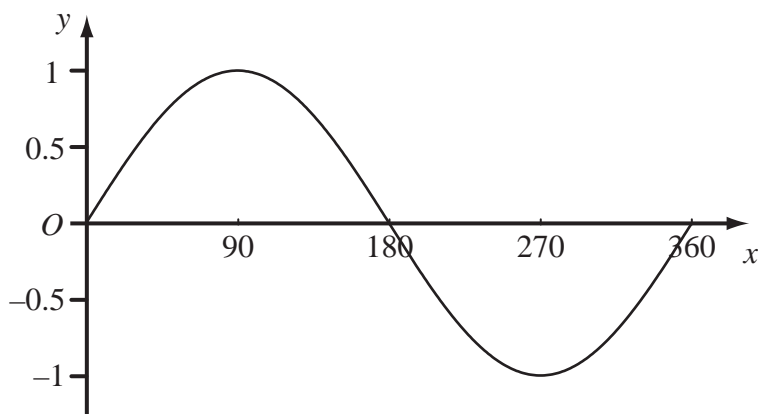
(b) $y = 2f(x)$

(..... ,)
(1)

(Total 2 marks)



3. The diagram shows a sketch of the curve $y = \sin x^\circ$ for $0 \leq x \leq 360$



The exact value of $\sin 60^\circ = \frac{\sqrt{3}}{2}$

(a) Write down the exact value of

(i) $\sin 120^\circ$,

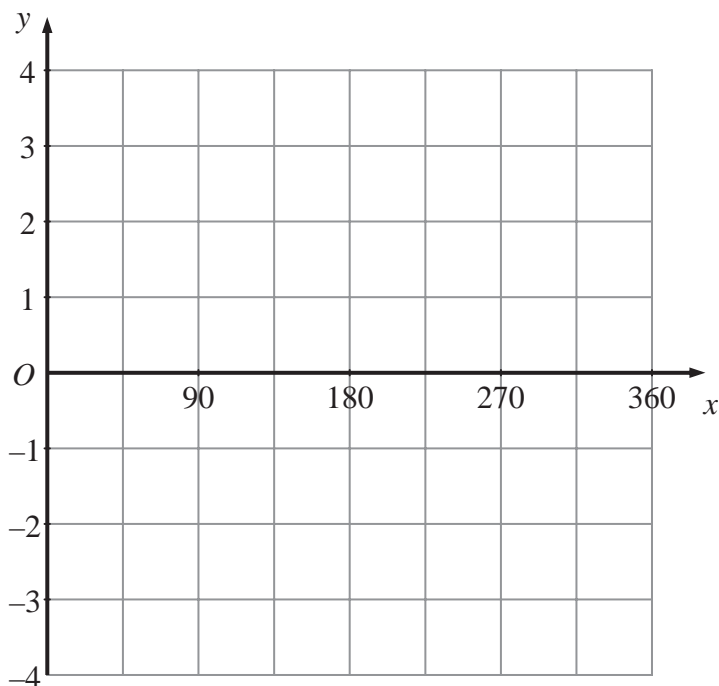
.....

(ii) $\sin 300^\circ$.

.....

(2)

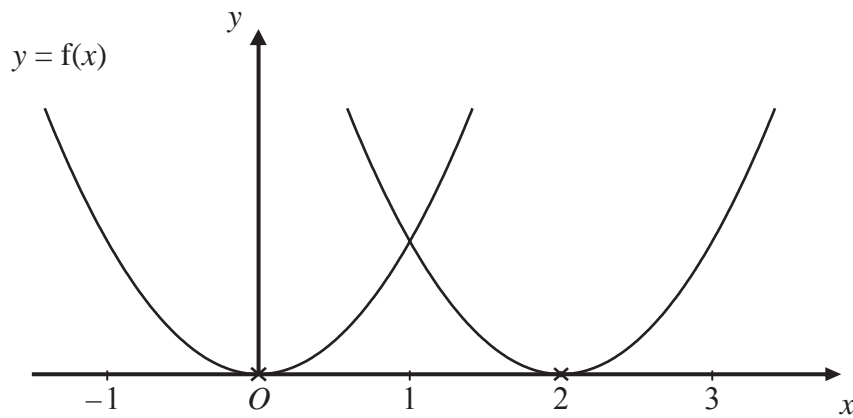
(b) On the grid below, sketch the graph of $y = 3 \sin 2x^\circ$ for $0 \leq x \leq 360$



(2)



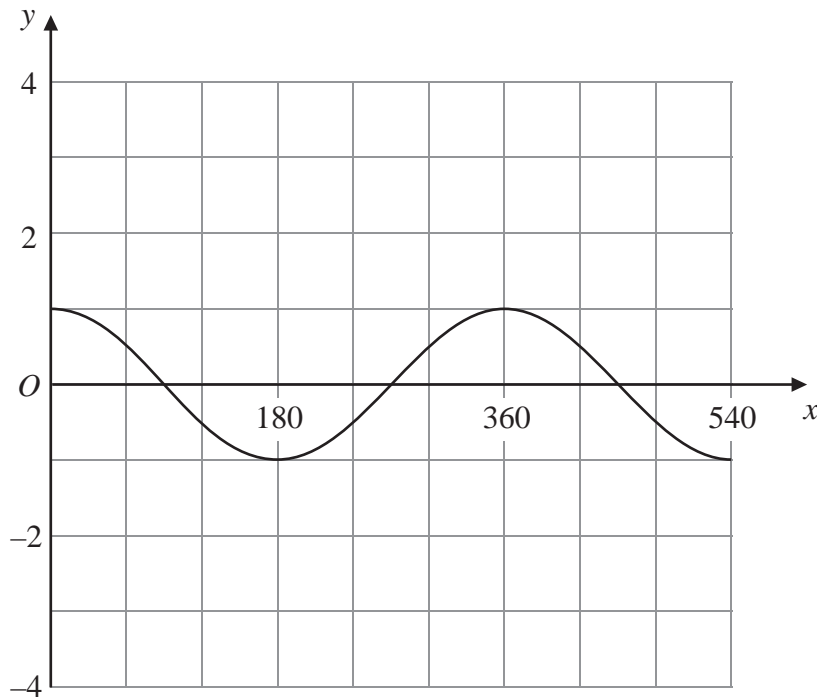
4.



The curve with equation $y = f(x)$ is translated so that the point at $(0, 0)$ is mapped onto the point $(2, 0)$.

(a) Find an equation of the translated curve.

.....
(2)



The grid shows the graph of $y = \cos x^\circ$ for values of x from 0 to 540

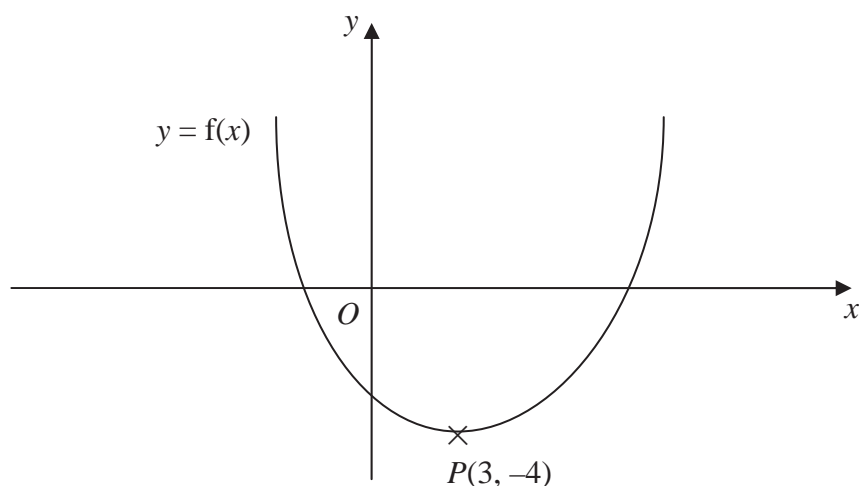
(b) On the grid, sketch the graph of $y = 3 \cos(2x^\circ)$ for values of x from 0 to 540

(2)

(Total 4 marks)



5. This is a sketch of the curve with the equation $y = f(x)$.
The only minimum point of the curve is at $P(3, -4)$.



- (a) Write down the coordinates of the minimum point of the curve with the equation $y = f(x - 2)$

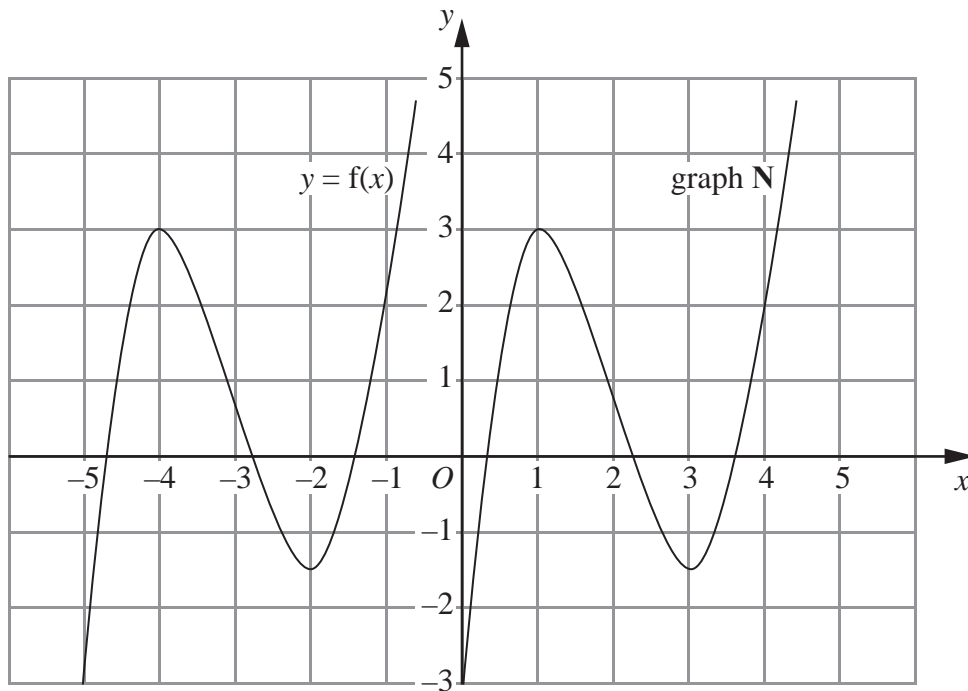
(..... ,)
(2)

- (b) Write down the coordinates of the minimum point of the curve with the equation $y = f(x + 5) + 6$

(..... ,)
(2)



6. The graph of $y = f(x)$ is shown on the grid.



The graph N is a translation of the graph of $y = f(x)$.

(a) Write down in terms of f , the equation of graph N

$y = \dots\dots\dots$
(1)

The graph of $y = f(x)$ has a maximum point at $(-4, 3)$.

(b) Write down the coordinates of the maximum point of the graph of $y = f(-x)$.

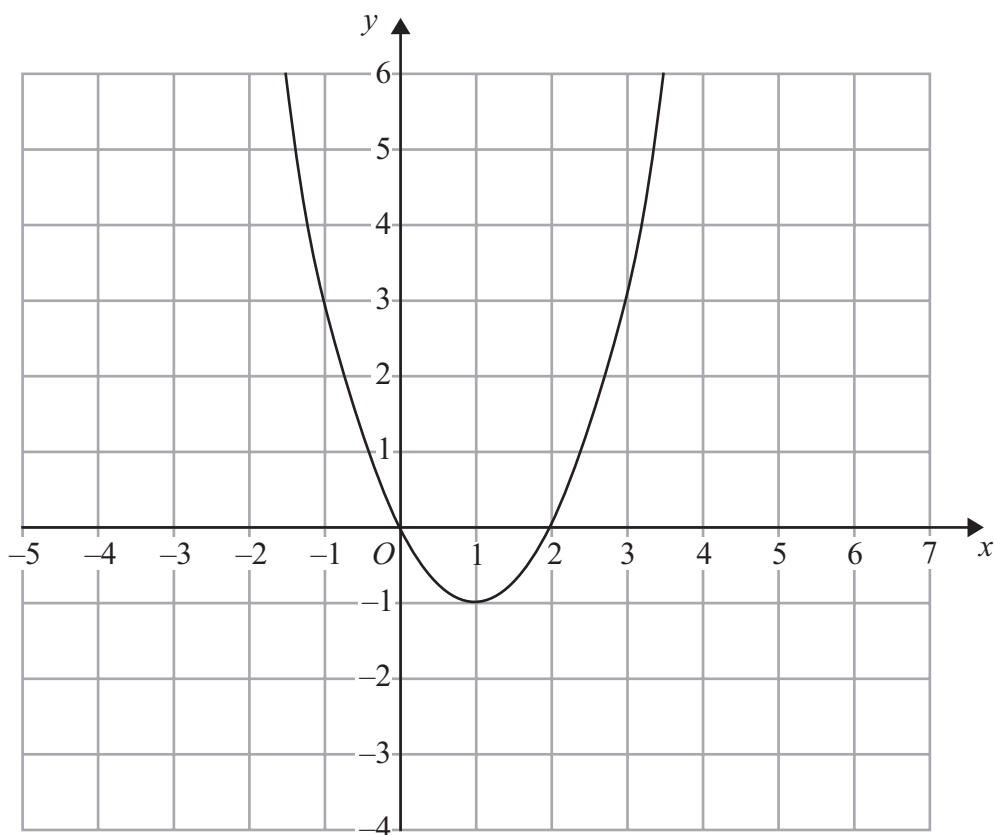
$(\dots\dots\dots, \dots\dots\dots)$
(2)

(Total 3 marks)



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

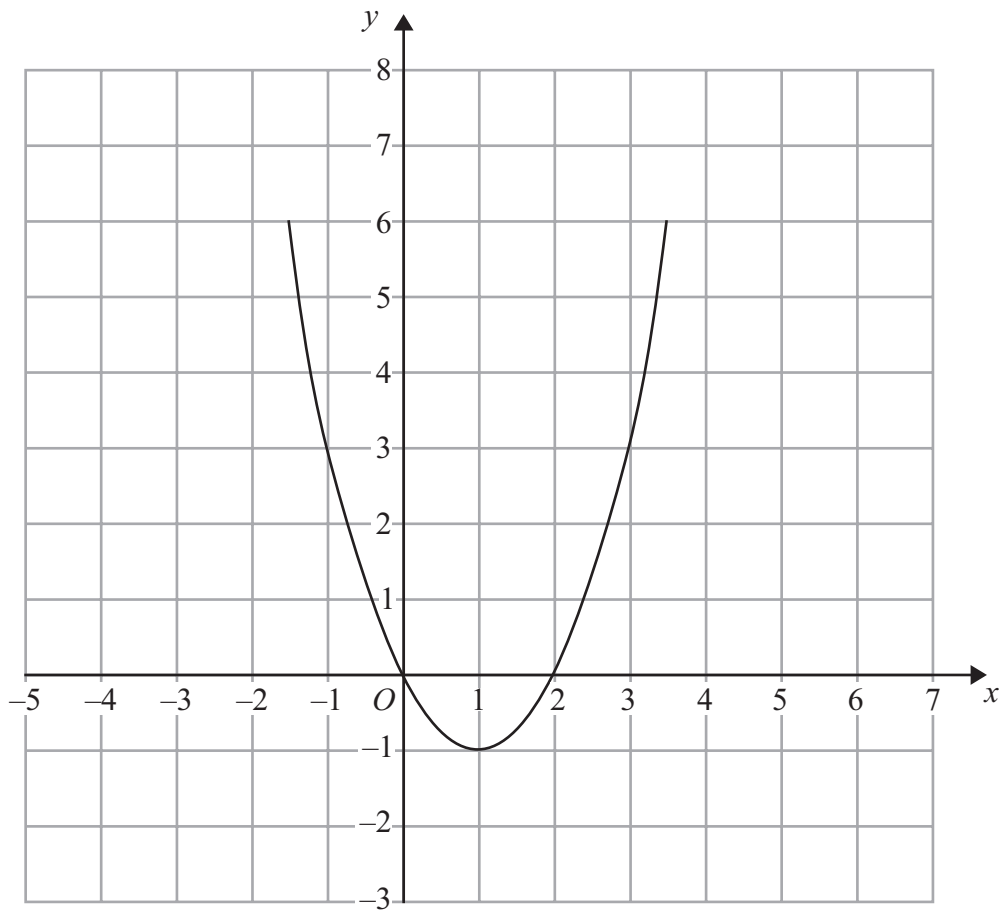
(a) On this grid, sketch the graph of $y = f(x - 2)$



(2)



(b) On this grid, sketch the graph of $y = 2f(x)$



(2)

(Total 4 marks)



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Mathematics A

Trial and Improvement

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**



Information

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Advice

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- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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1. The equation

$$x^3 + 20x = 73$$

has a solution between 2 and 3

Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show **ALL** your working.

$x = \dots\dots\dots$

(Total 4 marks)



2. The equation

$$x^3 - x = 29$$

has a solution between 3 and 4

Use a trial and improvement method to find this solution.

Give your answer correct to 1 decimal place.

You must show **all** your working.

$x = \dots\dots\dots$

(Total 4 marks)



3. The equation

$$x^3 + 10x = 24$$

has a solution between 1 and 2

Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show **all** your working.

$x = \dots\dots\dots$

(Total 4 marks)



4. The equation

$$x^3 + 10x = 50$$

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.

$x = \dots\dots\dots$

(Total 4 marks)



5. The equation

$$x^3 + 5x = 66$$

has a solution between 3 and 4

Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show **ALL** your working.

$x = \dots\dots\dots$

(Total 4 marks)



6. The equation

$$2x^3 - x = 80$$

has a solution between 3 and 4

Use a trial and improvement method to find this solution.
Give your answer correct to one decimal place.
You must show **ALL** your working.

$x = \dots\dots\dots$

(Total 4 marks)



7. The equation

$$x^3 + 2x = 78$$

has a solution between 4 and 5

Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show **ALL** your working.

$x = \dots\dots\dots$

(Total 4 marks)



8. The equation $x^3 + 3x = 41$

has a solution between 3 and 4

Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show **all** your working.

$x = \dots\dots\dots$

(Total 4 marks)



9. The equation

$$x^3 - 6x = 72$$

has a solution between 4 and 5

Use a trial and improvement method to find this solution.

Give your answer correct to one decimal place.

You must show **all** your working.

$x = \dots\dots\dots$

(Total 4 marks)



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Mathematics A

Trigonometry

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

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- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►



1. ABC is a right-angled triangle. $AB = 18$ cm and $BC = 6$ cm.
The line BD bisects the angle ABC .

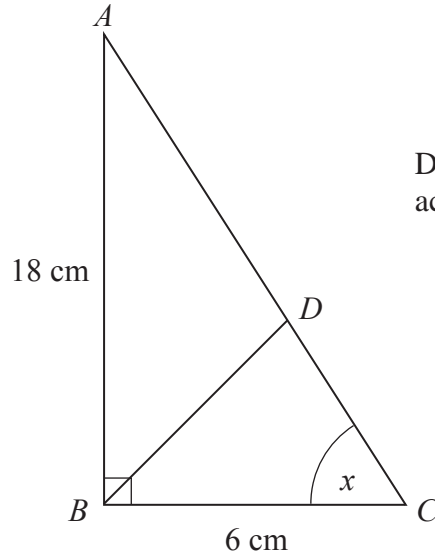


Diagram **NOT** accurately drawn

- (a) Write down the value of $\tan x$.

.....

- (b) Calculate the length BD .

(1)

..... cm

(5)

(Total 6 marks)



2. Here is a right-angled triangle.

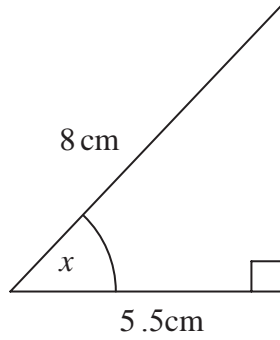


Diagram **NOT** accurately drawn

- (a) Calculate the size of the angle marked x .
Give your answer correct to 1 decimal place.

$$x = \dots\dots\dots^\circ$$

(3)

Here is another right-angled triangle.

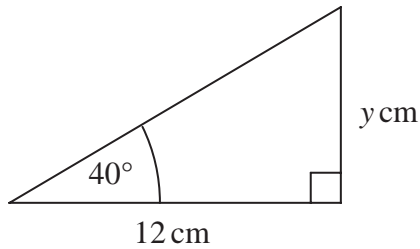


Diagram **NOT** accurately drawn

- (b) Calculate the value of y .
Give your answer correct to 1 decimal place.

$$y = \dots\dots\dots$$

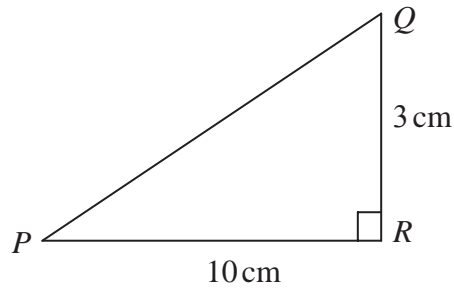
(3)

(Total 6 marks)



3.

Diagram **NOT**
accurately drawn



PQR is a right-angled triangle.

$QR = 3\text{ cm}$
 $PR = 10\text{ cm}$

Work out the size of angle RPQ .
Give your answer correct to 3 significant figures.

.....^o

(Total 3 marks)



4.

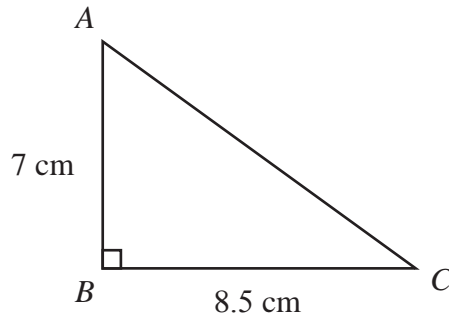


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.

$AB = 7$ cm,

$BC = 8.5$ cm.

(a) Work out the area of the triangle.

..... cm^2
(2)

(b) Work out the length of AC .

Give your answer correct to 2 decimal places.

..... cm
(3)



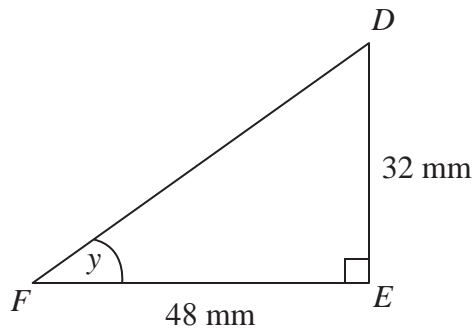


Diagram **NOT**
accurately drawn

DEF is another right-angled triangle.

$DE = 32\text{ mm}$,

$FE = 48\text{ mm}$.

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

.....
(3)

(Total 8 marks)



5.

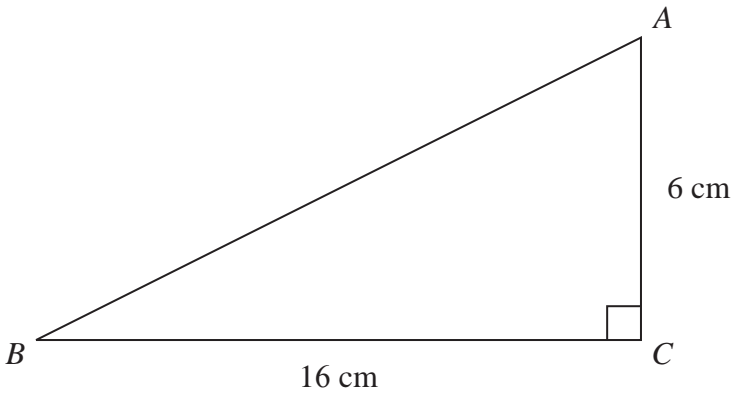


Diagram **NOT**
accurately drawn

ABC is a right-angled triangle.

$AC = 6$ cm.

$BC = 16$ cm.

(a) Work out the area of triangle ABC .

..... cm^2
(2)

(b) Calculate the length of AB .
Give your answer correct to 2 decimal places.

..... cm
(3)

(Total 5 marks)



6.

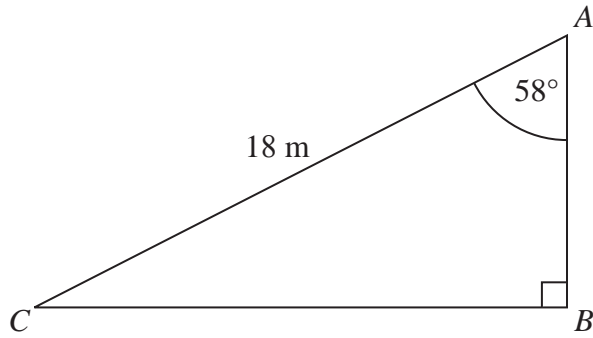


Diagram **NOT**
accurately drawn

ABC is a right-angled triangle.

$AC = 18$ m.

Angle $CAB = 58^\circ$

Calculate the length of *AB*.

Give your answer correct to 3 significant figures.

..... m

(Total 3 marks)



7.

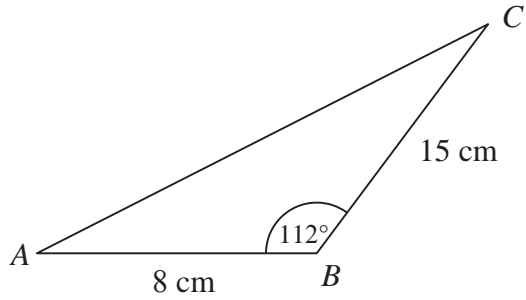


Diagram **NOT**
accurately drawn

ABC is a triangle.

$AB = 8$ cm

$BC = 15$ cm

Angle $ABC = 112^\circ$

Calculate the area of the triangle.

Give your answer correct to 3 significant figures.

..... cm²

(Total 3 marks)



8. Town B is 4.6 km due West of town C .
Town A is 2.3 km due North of town B .

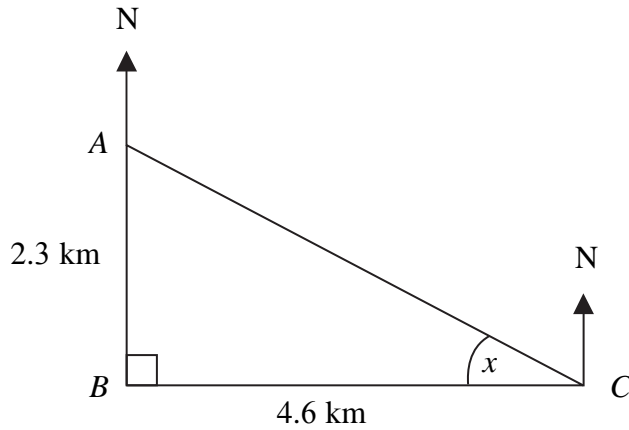


Diagram **NOT**
accurately drawn

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

$$x = \dots\dots\dots^\circ$$

(3)

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

$$\dots\dots\dots^\circ$$

(1)

(Total 4 marks)



9.

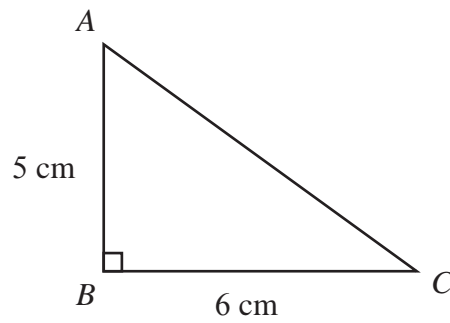


Diagram **NOT**
accurately drawn

ABC is a right-angled triangle.

$AB = 5$ cm,

$BC = 6$ cm.

(a) Work out the area of the triangle.

..... cm^2
(2)

(b) Work out the length of AC .
Give your answer correct to 2 decimal places.

..... cm
(3)



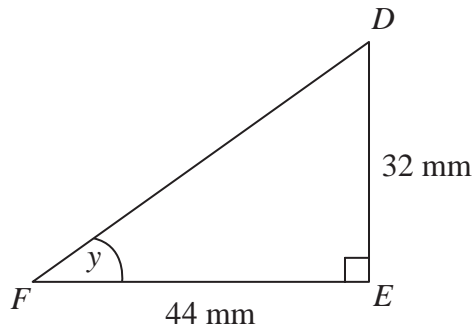


Diagram **NOT**
accurately drawn

DEF is another right-angled triangle.

$DE = 32$ mm,

$FE = 44$ mm.

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

.....
(3)

(Total 8 marks)



10.

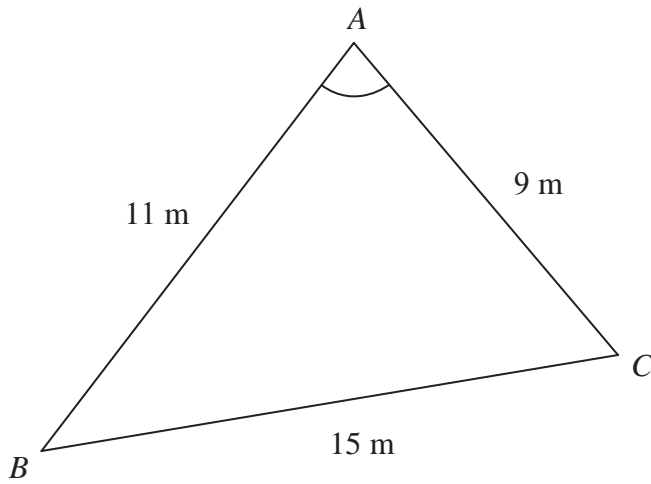


Diagram **NOT**
accurately drawn

ABC is a triangle.

$AB = 11$ m.

$AC = 9$ m.

$BC = 15$ m.

Calculate the size of angle BAC .

Give your answer correct to one decimal place.

.....
°

(Total 3 marks)



11.

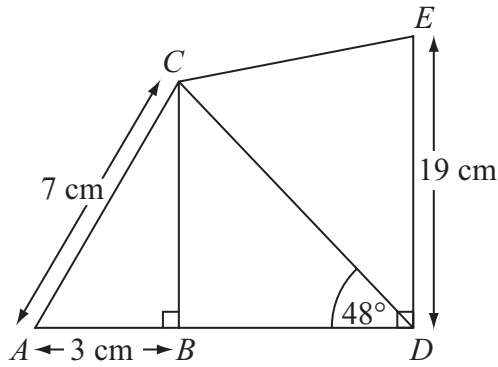


Diagram **NOT** accurately drawn

$AC = 7 \text{ cm.}$

$AB = 3 \text{ cm.}$

$DE = 19 \text{ cm.}$

Angle $ABC = \text{angle } CBD = \text{angle } BDE = 90^\circ.$

Angle $BDC = 48^\circ.$

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

..... cm
(4)

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

..... cm
(3)



12

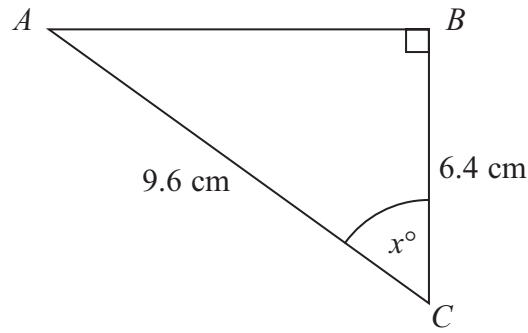


Diagram **NOT**
accurately drawn

ABC is a right-angled triangle.
 $AC = 9.6 \text{ cm}$.
 $BC = 6.4 \text{ cm}$.

Calculate the size of the angle marked x° .
Give your answer correct to 1 decimal place.

.....
(Total 3 marks)



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Mathematics A

Vectors

Higher Tier

Past Paper Style Questions
Arranged by Topic

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

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- **Calculators must not be used.**



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Turn over ►



1.

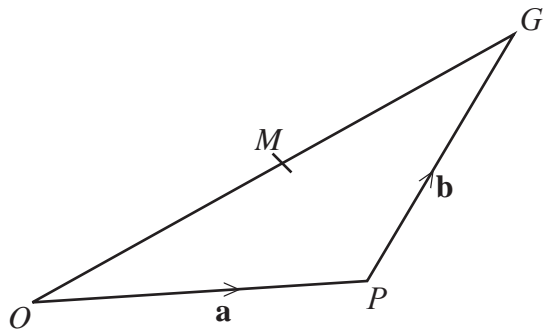


Diagram **NOT**
accurately drawn

OGP is a triangle.

M is the midpoint of OG .

$$\vec{OP} = \mathbf{a}$$

$$\vec{PG} = \mathbf{b}$$

(a) Express \vec{OM} in terms of \mathbf{a} and \mathbf{b} .

$$\vec{OM} = \dots\dots\dots (2)$$

(b) Express \vec{PM} in terms of \mathbf{a} and \mathbf{b}
Give your answer in its simplest form.

$$\vec{PM} = \dots\dots\dots (2)$$

(Total 4 marks)



2.

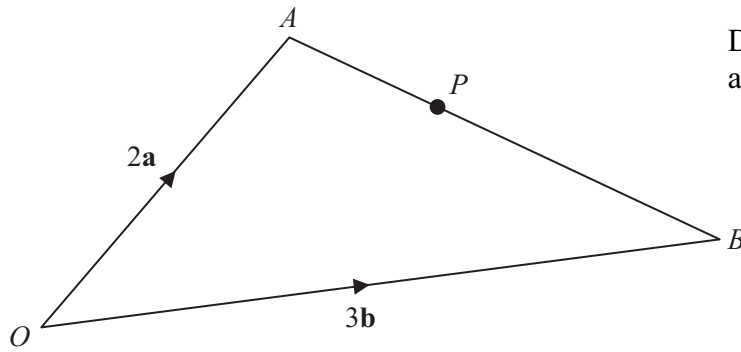


Diagram **NOT**
accurately drawn

OAB is a triangle.

$$\vec{OA} = 2\mathbf{a}$$

$$\vec{OB} = 3\mathbf{b}$$

(a) Find \vec{AB} in terms of \mathbf{a} and \mathbf{b} .

$$\vec{AB} = \dots\dots\dots \quad (1)$$

P is the point on AB such that $AP : PB = 2 : 3$

(b) Show that \vec{OP} is parallel to the vector $\mathbf{a} + \mathbf{b}$.

(3)

(Total 4 marks)



3.

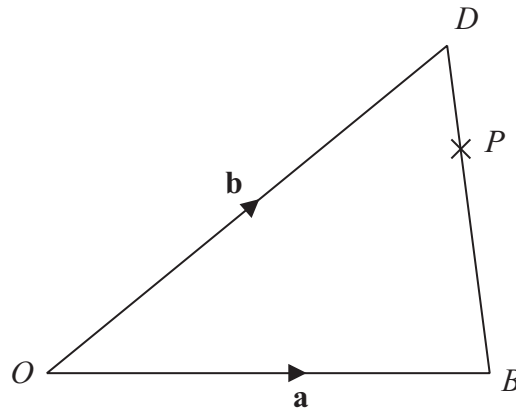


Diagram **NOT** accurately drawn

ODB is a triangle.

$$\vec{OB} = \mathbf{a}$$

$$\vec{OD} = \mathbf{b}$$

(a) Find \vec{BD} in terms of \mathbf{a} and \mathbf{b} .

.....
(1)

P is the point on DB such that $DP : PB = 1 : 3$

(b) Find \vec{OP} in terms of \mathbf{a} and \mathbf{b} .

Give your answer in its simplest form.

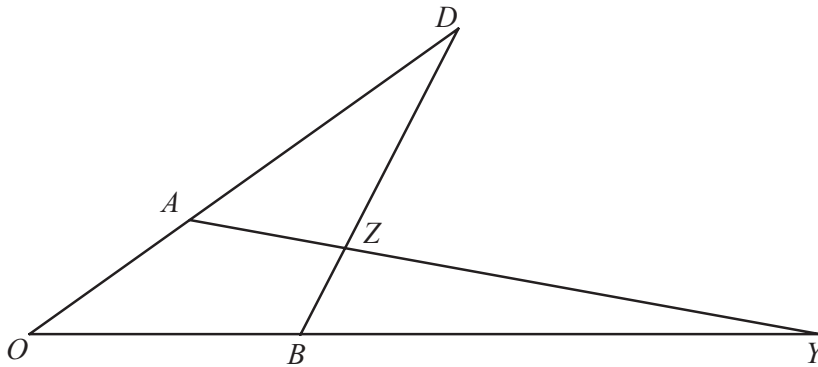
.....
(3)

(Total 4 marks)



4.

Diagram **NOT**
accurately drawn



In the diagram,

$$\vec{OA} = 4\mathbf{a} \quad \text{and} \quad \vec{OB} = 4\mathbf{b}$$

OAD , OBY and BZD are all straight lines

$$AD = 2OA \quad \text{and} \quad BZ : ZD = 1 : 3$$

(a) Find, in terms of \mathbf{a} and \mathbf{b} , the vectors which represent

(4)

(i) \vec{BD}

.....

(ii) \vec{AZ}

.....

Given that $\vec{BY} = 8\mathbf{b}$

(b) Show that AZY is a straight line.

(3)

(Total 7 marks)



5.

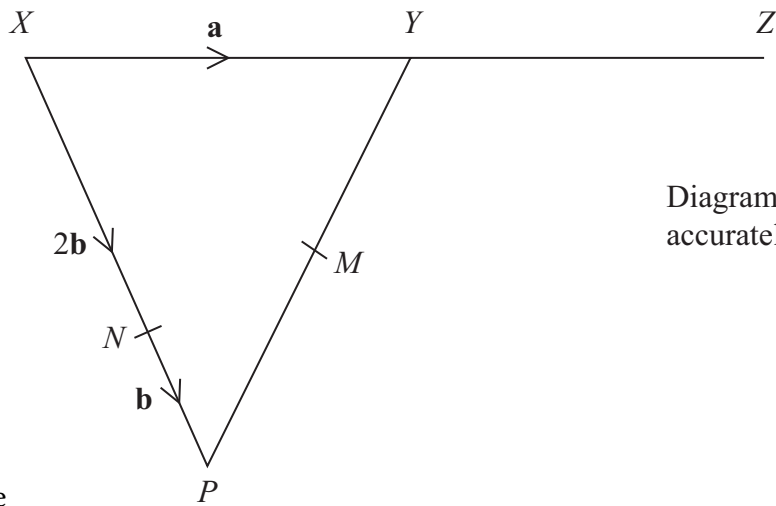


Diagram NOT
accurately drawn

XYP is a triangle
 N is a point on XP

$$\vec{XY} = \mathbf{a} \quad \vec{XN} = 2\mathbf{b} \quad \vec{NP} = \mathbf{b}$$

(a) Find the vector \vec{PX} , in terms of \mathbf{a} and \mathbf{b} .

(1)

Y is the midpoint of XZ
 M is the midpoint of PY

(b) Show that NMZ is a straight line.

(4)

(Total 5 marks)



6.

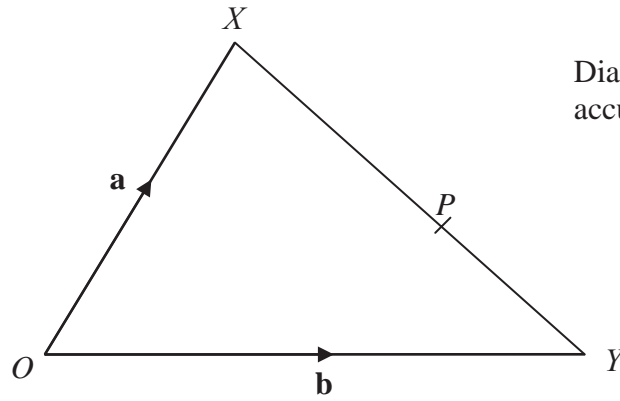


Diagram **NOT**
accurately drawn

OXY is a triangle.

$$\vec{OX} = \mathbf{a}$$

$$\vec{OY} = \mathbf{b}$$

(a) Find the vector \vec{XY} in terms of \mathbf{a} and \mathbf{b} .

$$\vec{XY} = \dots\dots\dots (1)$$

P is the point on XY such that $XP : PY = 3 : 2$

(b) Show that $\vec{OP} = \frac{1}{5}(2\mathbf{a} + 3\mathbf{b})$

(3)

(Total 4 marks)



7.

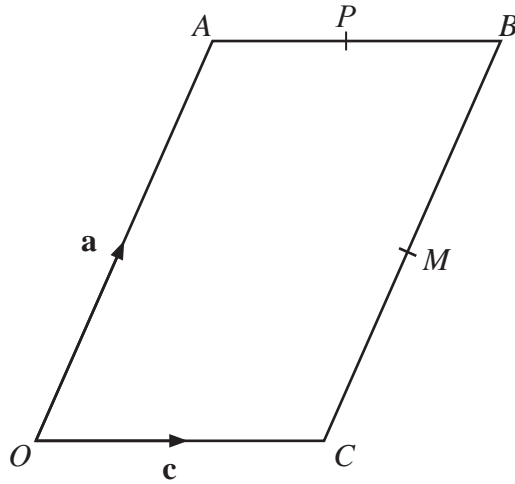


Diagram **NOT** accurately drawn

$OACB$ is a parallelogram.
 M is the midpoint of CB .
 P is the midpoint of AB .

$$\vec{OA} = \mathbf{a}$$

$$\vec{OC} = \mathbf{c}$$

(a) Find, in terms of \mathbf{a} and/or \mathbf{c} , the vectors

(i) \vec{MB} ,

.....

(ii) \vec{MP} .

.....

(2)

(b) Show that CA is parallel to MP .

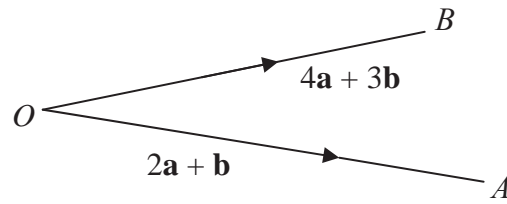
(2)

(Total 4 marks)



8.

Diagram **NOT**
accurately drawn



$$\vec{OA} = 2\mathbf{a} + \mathbf{b}$$

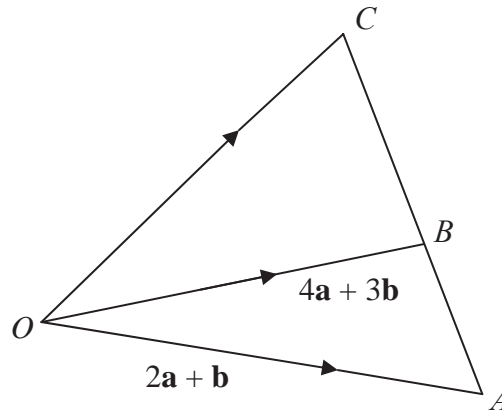
$$\vec{OB} = 4\mathbf{a} + 3\mathbf{b}$$

- (a) Express the vector \vec{AB} in terms of \mathbf{a} and \mathbf{b}
Give your answer in its simplest form.

.....
(2)



Diagram **NOT**
accurately drawn



ABC is a straight line.
 $CB : YZ = 2 : 3$

- (b) Express the vector \overrightarrow{OC} in terms of \mathbf{a} and \mathbf{b}
Give your answer in its simplest form.

.....
(3)

(Total 5 marks)



9.

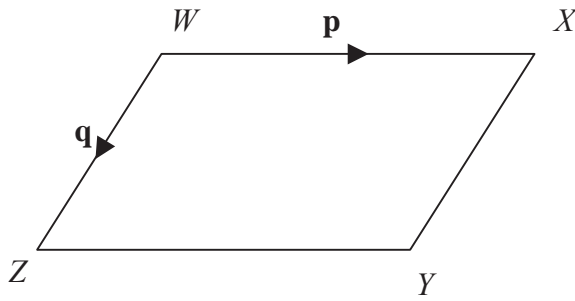


Diagram **NOT** accurately drawn

$WXYZ$ is a parallelogram.
 WX is parallel to ZY . WZ is parallel to XY .

$\vec{WX} = \mathbf{p}$

$\vec{WZ} = \mathbf{q}$

(a) Express, in terms of \mathbf{p} and \mathbf{q}

(i) \vec{WY}

(i).....

(ii) \vec{XZ}

(ii).....

(2)

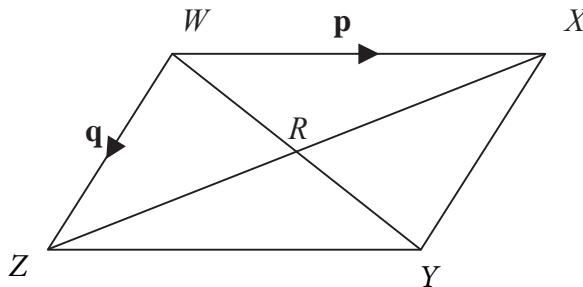


Diagram **NOT** accurately drawn

WX and ZY are diagonals of parallelogram $WXYZ$.
 WY and XZ intersect at R

(b) Express \vec{WR} in terms of \mathbf{p} and \mathbf{q} .

.....

(1)

(Total 3 marks)



10.

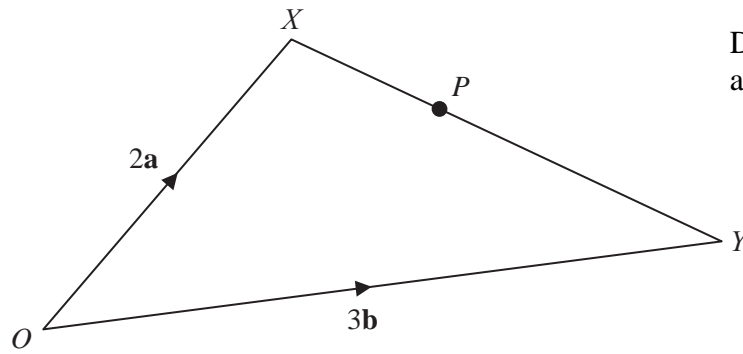


Diagram **NOT**
accurately drawn

OXY is a triangle.

$$\vec{OX} = 2\mathbf{a}$$

$$\vec{OY} = 3\mathbf{b}$$

(a) Find \vec{XY} in terms of \mathbf{a} and \mathbf{b} .

$$\vec{XY} = \dots\dots\dots \quad (1)$$

P is the point on XY such that $XP : PY = 2 : 3$

(b) Show that \vec{OP} is parallel to the vector $\mathbf{a} + \mathbf{b}$

(3)

(Total 4 marks)

