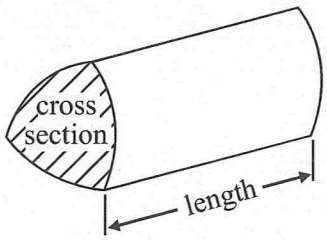
TARGET A PAPER

GCSE Mathematics 1MA0

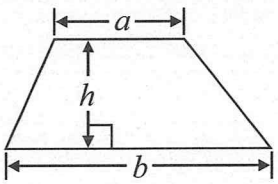
Formulae: Higher Tier

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 × length

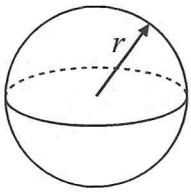


Area of trapezium = $\frac{1}{2}(a + b)h$



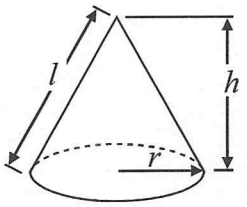
Volume of sphere = $\frac{4}{3}\pi r^3$

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

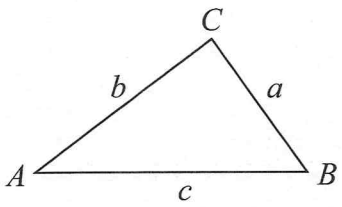


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



The Quadratic Equation

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

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

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

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

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

Leave blank

11. 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.

Q11

(Total 2 marks)

12. $-2 \leqslant x < 3$
x is an integer.

Write down all the possible values of x.

.....

Q12

(Total 2 marks)

2008-05-H-NC

Leave blank

13. (a) Write down the reciprocal of 4

.....

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

Sundas is **wrong**.
Explain why.

.....

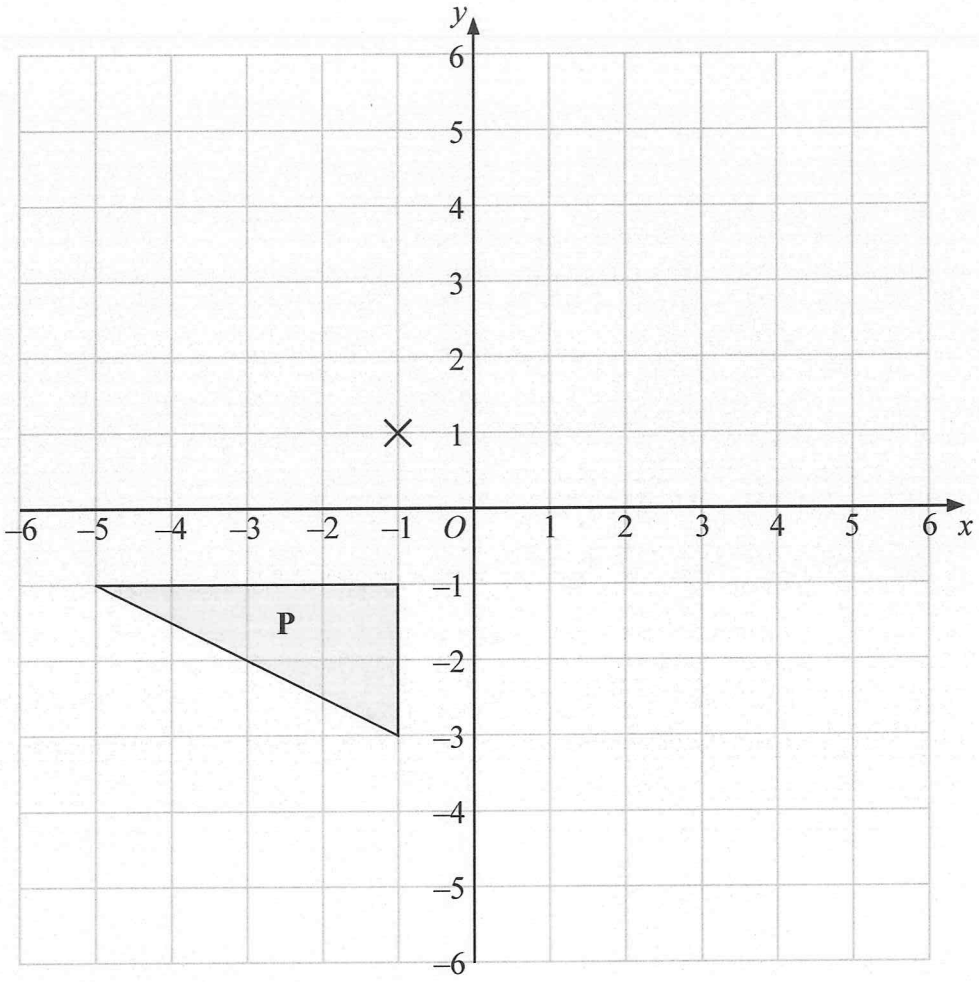
.....

(1) **Q13**

(Total 5 marks)

Leave blank

14.



(a) Rotate triangle **P** 180° about the point (–1, 1).

Label the new triangle **A**.

(2)

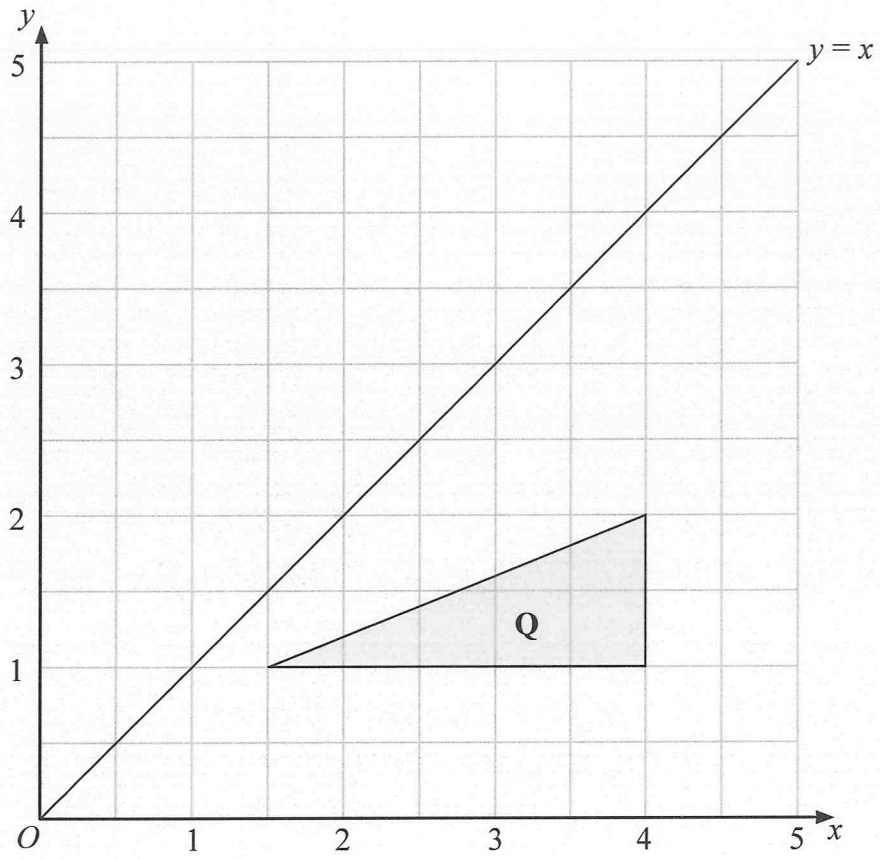
(b) Translate triangle **P** by the vector $\begin{pmatrix} 6 \\ -1 \end{pmatrix}$.

Label the new triangle **B**.

(1)

2008-05-H-NC

Leave blank



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

Label the new triangle **C**.

(2) **Q14**

(Total 5 marks)

Leave blank

15. (a) Expand $x(3x - 5y)$

.....

(2)

(b) Factorise $x^2 - 36$

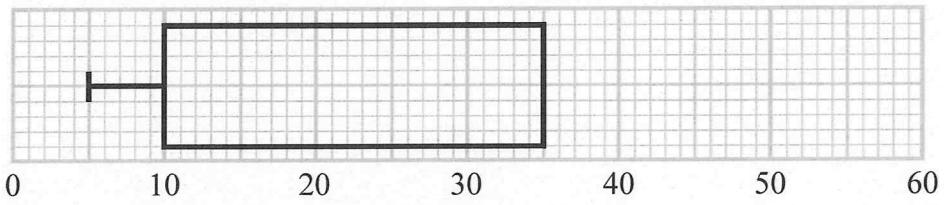
.....

(1)

Q15

(Total 3 marks)

16. 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)

Q16

(Total 3 marks)

2008-05-H-NC

Leave blank

17. (a) Write 6.4×10^4 as an ordinary number.

.....

(1)

(b) Write 0.0039 in standard form.

.....

(1)

(c) Write 0.25×10^7 in standard form.

.....

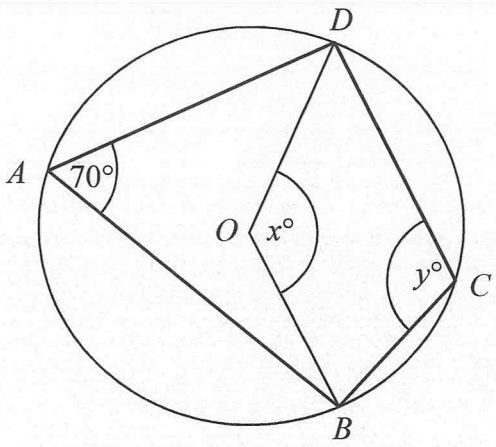
(1) **Q17**

(Total 3 marks)

Leave blank

18.

Diagram **NOT** accurately drawn



In the diagram, A, B, C and D are points on the circumference of a circle, centre O.
Angle $BAD = 70°$.
Angle $BOD = x°$.
Angle $BCD = y°$.

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

$x =$ .....

(ii) Give a reason for your answer.

.....

.....

(2)

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

$y =$ .....

(ii) Give a reason for your answer.

.....

.....

(2) **Q18**

(Total 4 marks)

2008-05-H-NC

Leave blank

19. Solve the simultaneous equations.

$$2x + 3y = 0$$
$$x - 3y = 9$$

$x =$..... , $y =$ **Q19**

(Total 3 marks)

Leave blank

10. There are 40 litres of water in a barrel.

The water flows out of the barrel at a rate of 125 millilitres per second.

1 litre = 1000 millilitres.

Work out the time it takes for the barrel to empty completely.

..... seconds **Q10**

(Total 3 marks)

Leave blank

11. The length of a line is 63 centimetres, correct to the nearest centimetre.

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

..... centimetres
(1)

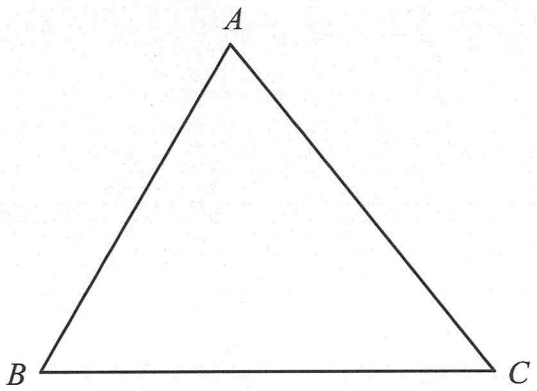
(b) Write down the **greatest** possible length of the line.

..... centimetres
(1)

Q11

(Total 2 marks)

12.



ABC is a triangle.

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

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

Q12

(Total 4 marks)

Leave blank

13. Fred is going to take a survey of the magazines read by students.

He wants to design a questionnaire.

(a) Design a suitable question that he could use to find out what types of magazine students read.

(2)

Fred put the question below on his questionnaire.

'How many magazines have you read?'

☐ A few ☐ A lot

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

(2) **Q13**

(Total 4 marks)

Leave blank

14. Work out an estimate for the value of

$$\frac{6.8\times191}{0.051}$$

.....

Q14

(Total 3 marks)

15. (a) Write 64 000 in standard form.

.....

(1)

(b) Write 156×10^{-7} in standard form.

.....

(1) **Q15**

(Total 2 marks)

16. (a) Factorise fully $4x^2 - 6xy$

.....

(2)

(b) Factorise $x^2 + 5x - 6$

.....

(2) **Q16**

(Total 4 marks)

Leave blank

17. Lucy did a survey about the amounts of money spent by 120 men during their summer holidays.

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

Amount (£A) spent	Cumulative frequency
$0 \leqslant A < 100$	13
$0 \leqslant A < 150$	25
$0 \leqslant A < 200$	42
$0 \leqslant A < 250$	64
$0 \leqslant A < 300$	93
$0 \leqslant A < 350$	110
$0 \leqslant A < 400$	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 women during their summer holidays gave a median of £205

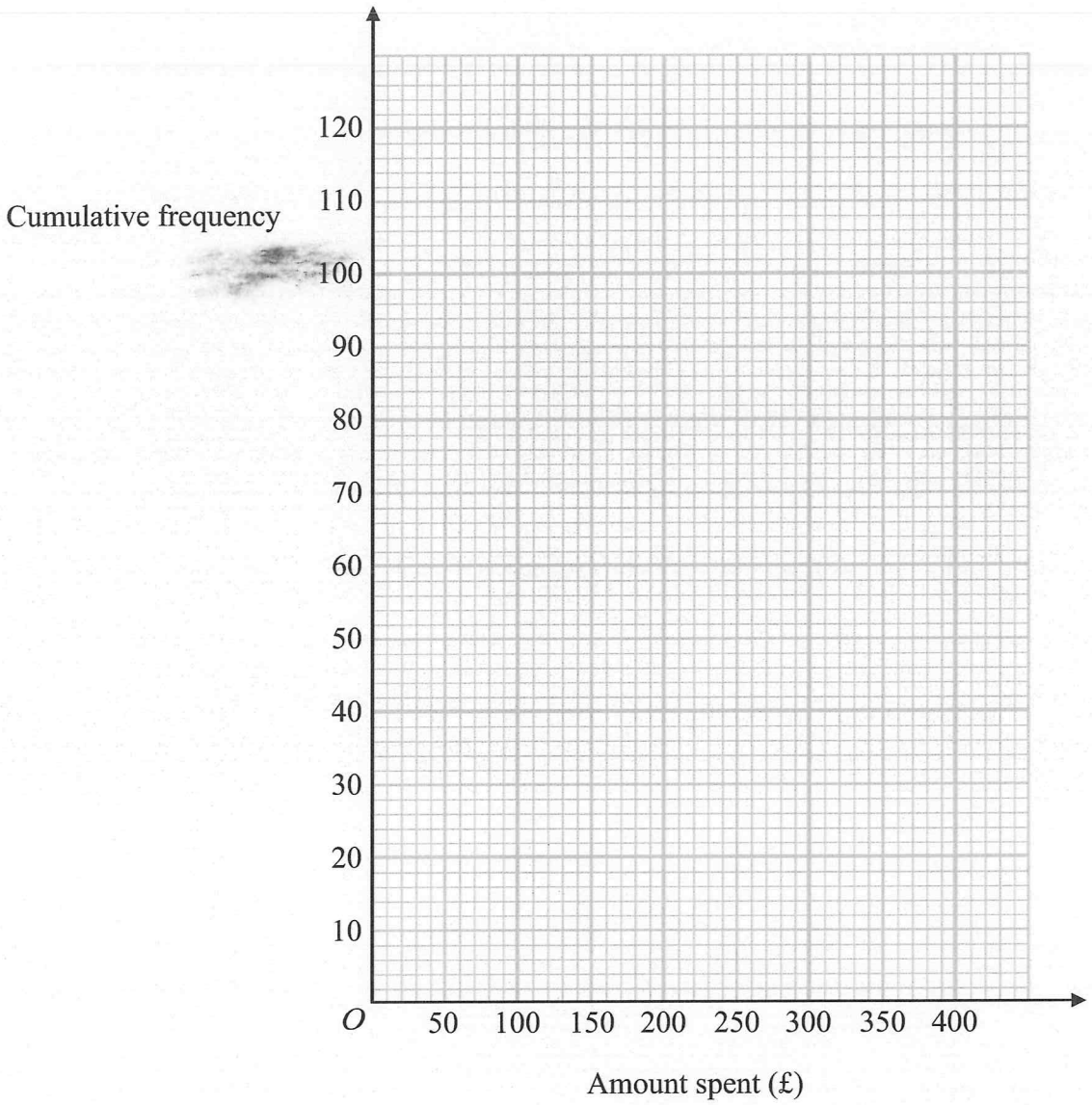
(c) Compare the amounts of money spent by the women with the amounts of money spent by the men.

.....

.....

(1)

Leave blank



Q17

(Total 5 marks)

Leave blank

18.

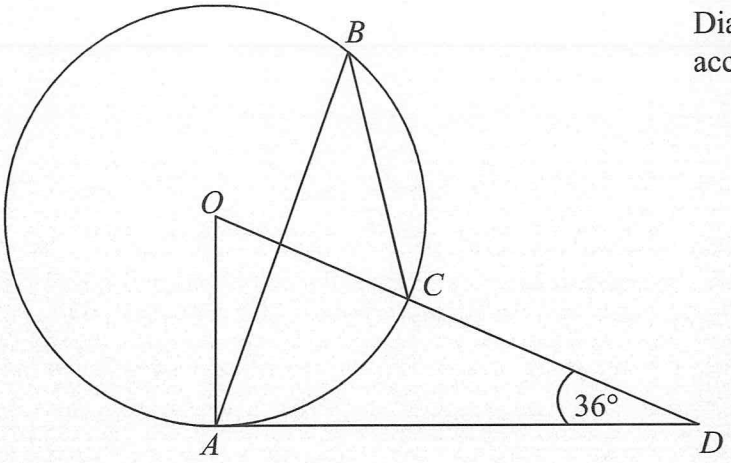


Diagram **NOT** accurately drawn

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 $ADO = 36°$

(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) **Q18**

(Total 5 marks)

***10** Railtickets and Cheaptrains are two websites selling train tickets.

Each of the websites adds a credit card charge and a booking fee to the ticket price.

Railtickets	**Cheaptrains**
Credit card charge: 2.25% of ticket price	Credit card charge: 1.5% of ticket price
Booking fee: 80 pence	Booking fee: £1.90

Nadia wants to buy a train ticket.
The ticket price is £60 on each website.
Nadia will pay by credit card.

Will it be cheaper for Nadia to buy the train ticket from Railtickets or from Cheaptrains?

(Total for Question 10 is 4 marks)

11

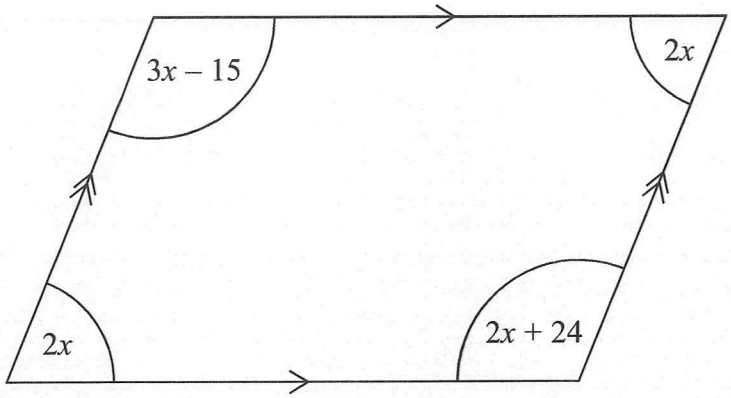


Diagram **NOT** accurately drawn

The diagram shows a parallelogram.
The sizes of the angles, in degrees, are

$2x$
$3x - 15$
$2x$
$2x + 24$

Work out the value of x.

$x =$ .....

(Total for Question 11 is 3 marks)

12 Jane has a carton of orange juice.
The carton is in the shape of a cuboid.

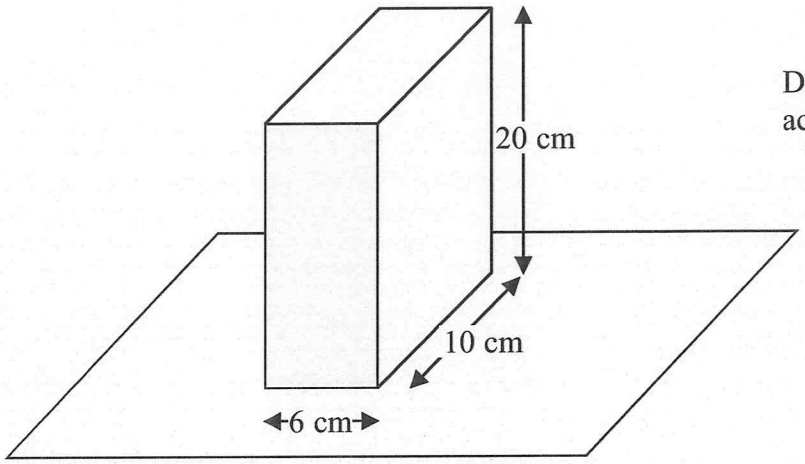


Diagram **NOT** accurately drawn

The depth of the orange juice in the carton is 8 cm.

Jane closes the carton.
Then she turns the carton over so that it stands on the shaded face.

Work out the depth, in cm, of the orange juice now.

..... cm

(Total for Question 12 is 3 marks)

13

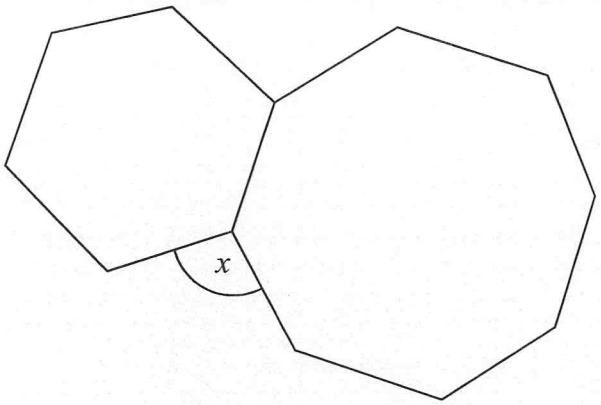


Diagram **NOT** accurately drawn

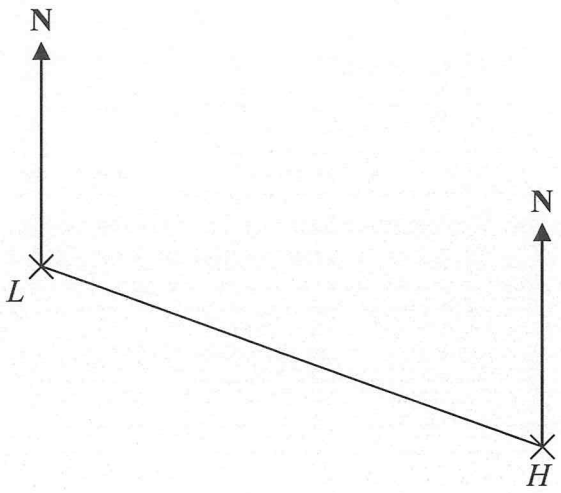
The diagram shows a regular hexagon and a regular octagon.

Calculate the size of the angle marked x.
You must show all your working.

.....°

(Total for Question 13 is 4 marks)

14 The diagram shows the position of a lighthouse L and a harbour H.



The scale of the diagram is 1 cm represents 5 km.

(a) Work out the real distance between L and H.

..... km

(1)

(b) Measure the bearing of H from L.

..... °

(1)

A boat B is 20 km from H on a bearing of 040°.

(c) On the diagram, mark the position of boat B with a cross (×).
Label it B.

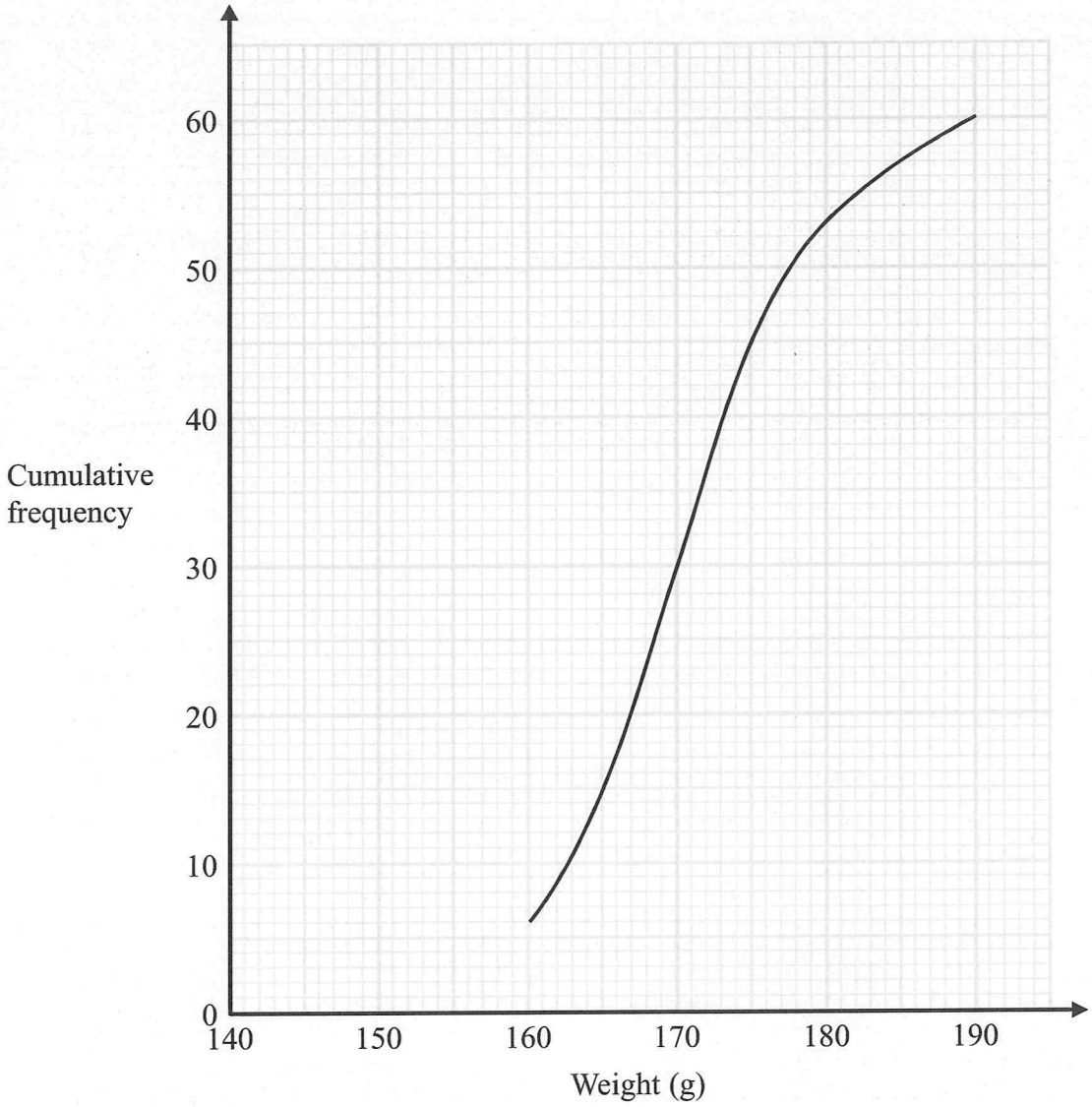
(2)

(Total for Question 14 is 4 marks)

15 Harry grows tomatoes.
This year he put his tomato plants into two groups, group A and group B.

Harry gave fertiliser to the tomato plants in group A.
He did not give fertiliser to the tomato plants in group B.

Harry weighed 60 tomatoes from group A.
The cumulative frequency graph shows some information about these weights.



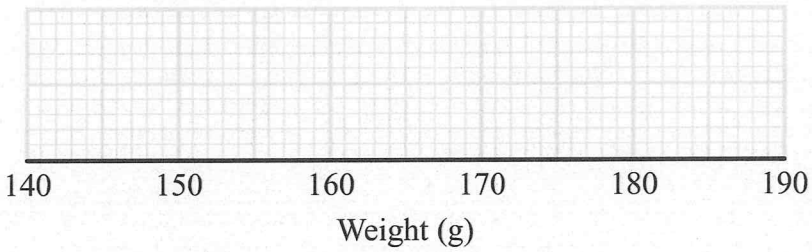
(a) Use the graph to find an estimate for the median weight.

..... g

(1)

The 60 tomatoes from group A
had a minimum weight of 153 grams
and a maximum weight of 186 grams.

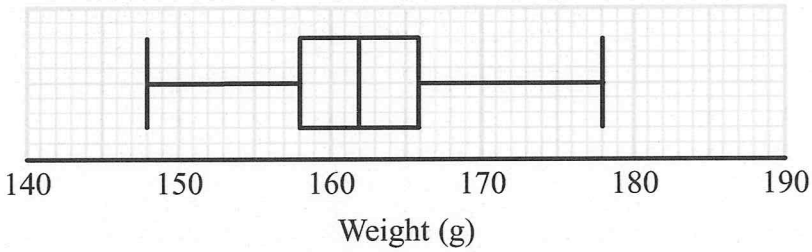
(b) Use this information and the cumulative frequency graph to draw a box plot for the 60 tomatoes from group A.



(3)

Harry did not give fertiliser to the tomato plants in group B.

Harry weighed 60 tomatoes from group B.
He drew this box plot for his results.



(c) Compare the distribution of the weights of the tomatoes from group A with the distribution of the weights of the tomatoes from group B.

.....

.....

.....

.....

(2)

(Total for Question 15 is 6 marks)

16 (a) Simplify $(m^{-2})^5$

.....

(1)

(b) Factorise $x^2 + 3x - 10$

.....

(2)

(Total for Question 16 is 3 marks)

17 (a) Write down the value of 10^0

.....

(1)

(b) Write 6.7×10^{-5} as an ordinary number.

.....

(1)

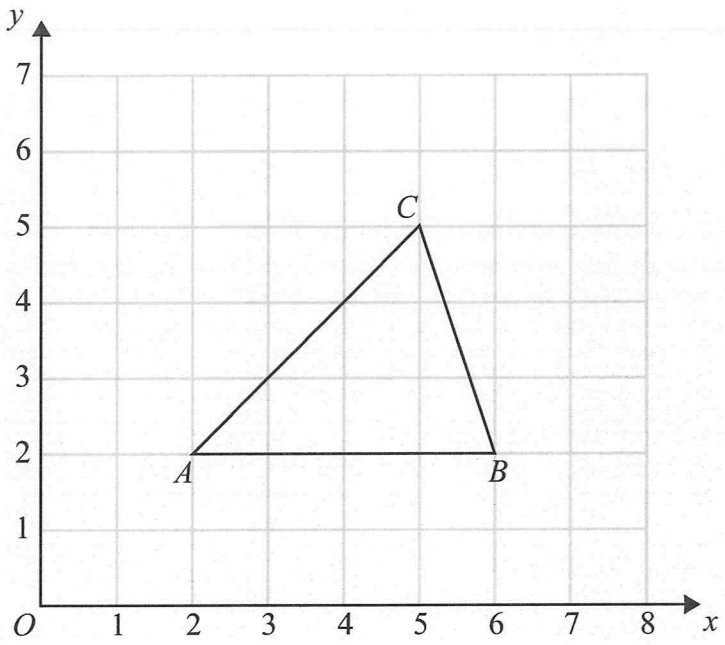
(c) Work out the value of $(3 \times 10^7) \times (9 \times 10^6)$
Give your answer in standard form.

.....

(2)

(Total for Question 17 is 4 marks)

18



Triangle ABC is drawn on a centimetre grid.
A is the point (2, 2).
B is the point (6, 2).
C is the point (5, 5).

Triangle PQR is an enlargement of triangle ABC with scale factor $\frac{1}{2}$ and centre (0, 0).

Work out the area of triangle PQR.

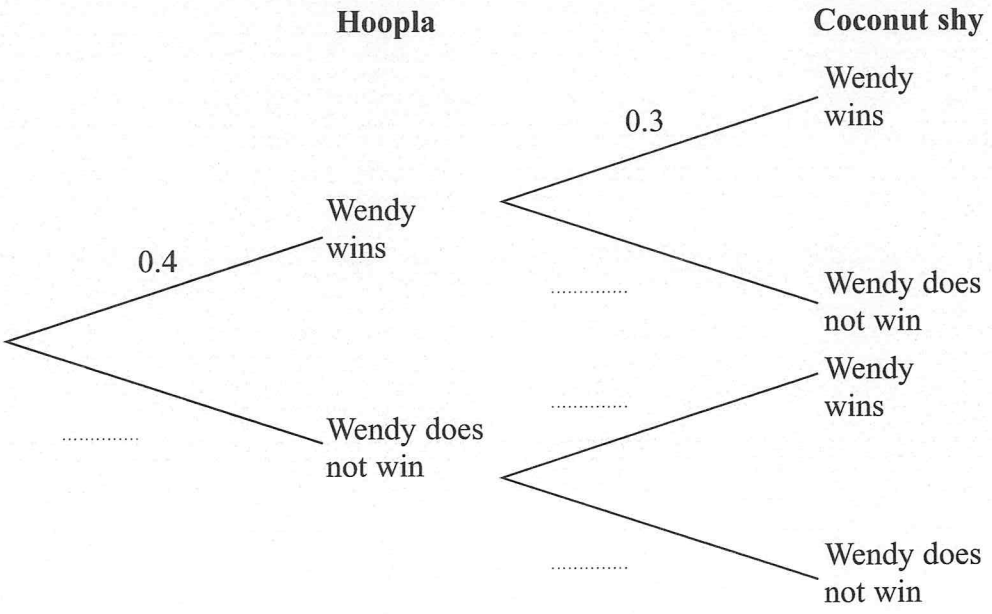
..... cm^2

(Total for Question 18 is 3 marks)

19 Wendy goes to a fun fair.
She has one go at Hoopla.
She has one go on the Coconut shy.

The probability that she wins at Hoopla is 0.4
The probability that she wins on the Coconut shy is 0.3

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Wendy wins at Hoopla and also wins on the Coconut shy.

.....

(2)

(Total for Question 19 is 4 marks)

20 Solve the simultaneous equations

$$5x + 2y = 11$$
$$4x - 3y = 18$$

$x =$ .....

$y =$ .....

(Total for Question 20 is 4 marks)