

Write your name here

Surname

Other names

Pearson
Edexcel GCSE

Centre Number

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Candidate Number

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May/June 2017
Predicted Paper 2

Higher Tier

Time: 1 hour 45 minutes

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.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

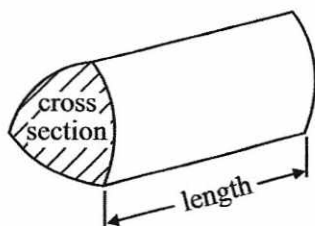
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

GCSE Mathematics 1MA0

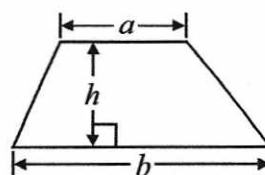
Formulae: Higher Tier

**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

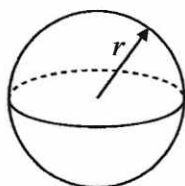


Area of trapezium = $\frac{1}{2} (a + b)h$



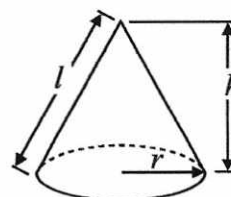
Volume of sphere = $\frac{4}{3} \pi r^3$

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

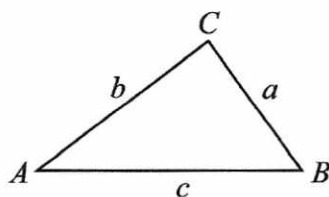


Volume of cone = $\frac{1}{3} \pi r^2 h$

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

Answer ALL questions.

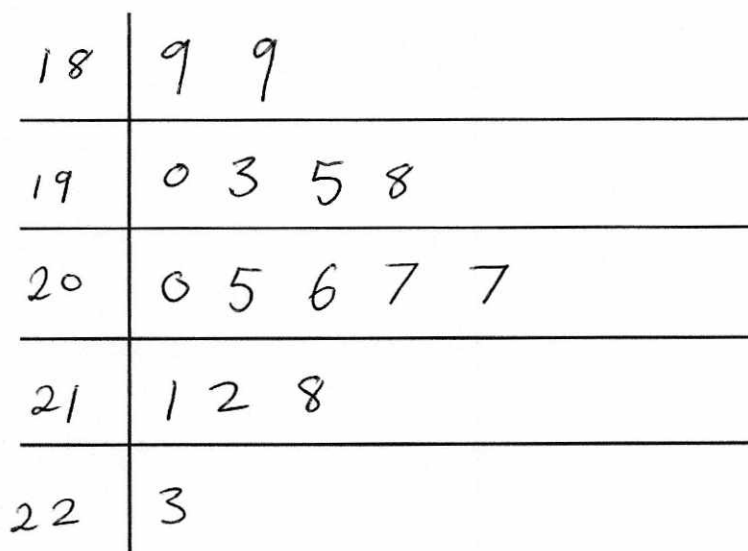
Write your answers in the spaces provided.

You must write down all stages in your working.

- 1 The list below shows the weight, in grams, of 15 baskets of strawberries.

~~193~~ ~~200~~ ~~207~~ ~~211~~ ~~198~~
~~189~~ ~~218~~ ~~195~~ ~~206~~ ~~189~~
~~223~~ ~~190~~ ~~207~~ ~~205~~ ~~212~~

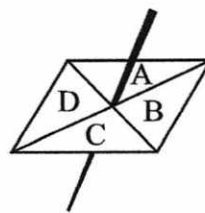
Show this information in an ordered stem and leaf diagram.
You must include a key.



Key: $18|9 = 189\text{g}$

(Total for Question 1 is 3 marks)

- 2 Here is a four-sided spinner.
The sides of the spinner are labelled A, B, C and D.



The table shows the probability that the spinner will land on A or on B or on D.

Letter	A	B	C	D
Probability	0.12	0.39		0.18

Amber spins the spinner once.

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

$$0.12 + 0.39 + 0.18 = 0.69$$

$$1 - 0.69$$

$$\begin{array}{r} 0.31 \\ \hline (2) \end{array}$$

Lucy is going to spin the spinner 50 times.

- (b) Work out an estimate for the number of times the spinner will land on A.

$$0.12 \times 50$$

$$\begin{array}{r} 6 \\ \hline (2) \end{array}$$

(Total for Question 2 is 4 marks)

- 3 Use your calculator to work out $\frac{\sqrt{40.96}}{7.1 - 2.48}$

Write down all the figures on your calculator display.
You must give your answer as a decimal.

1.385281385

(Total for Question 3 is 2 marks)

- *4 The diagram shows a flower bed in the shape of a circle.

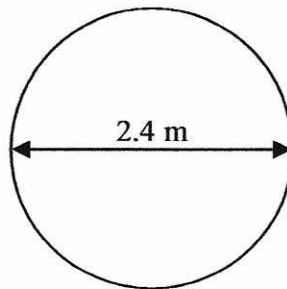


Diagram NOT
accurately drawn

The flower bed has a diameter of 2.4 m.

Sue is going to put a plastic strip around the edge of the flower bed.
The plastic strip is sold in 2 metre rolls.

How many rolls of plastic strip does Sue need to buy?
You must show all your working.

$$\begin{aligned}\text{Circumference} &= \pi \times d \\ &= \pi \times 2.4 \\ &= 7.539822369 \text{ m}\end{aligned}$$

$$\frac{\text{Ans}}{2} = 3.7699\dots$$

4 rolls

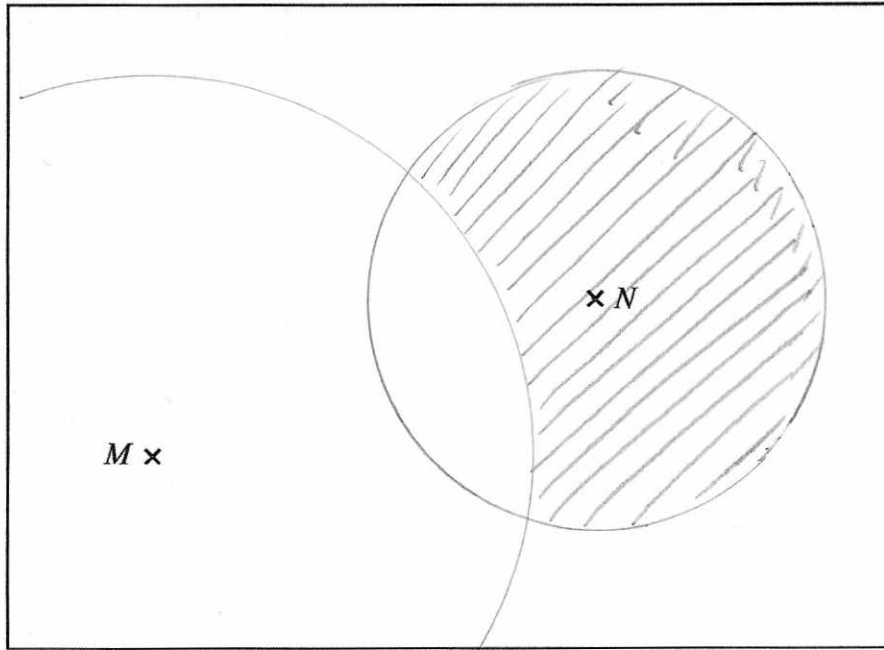
(Total for Question 4 is 4 marks)

5 Here is a map.
The map shows two towns Marlford (M) and Newborough (N).

A company is going to build a supermarket.

The supermarket will be more than 10 km from Marlford and less than 6 km from Newborough.

Find and shade the region on the map where the company can build the supermarket.



Scale: 1 cm represents 2 km.

(Total for Question 5 is 3 marks)

6 Here are the ingredients needed to make 16 chocolate biscuits.

<p style="text-align: center;">Chocolate biscuits</p> <p style="text-align: center;">Makes 16 chocolate biscuits</p> <p style="text-align: center;">100 g of butter 50 g of caster sugar 120 g of flour 15 g of cocoa</p>

Sabrina has 250 g of butter
300 g of caster sugar
600 g of flour
and 60 g of cocoa

Work out the greatest number of chocolate biscuits Sabrina can make.
You must show your working.

$$\text{Butter } \frac{250}{100} \times 16 = 40$$

$$\text{Caster Sugar } \frac{300}{50} \times 16 = 96$$

$$\text{Flour } \frac{600}{120} \times 16 = 80$$

$$\text{Cocoa } \frac{60}{15} \times 16 = 64$$

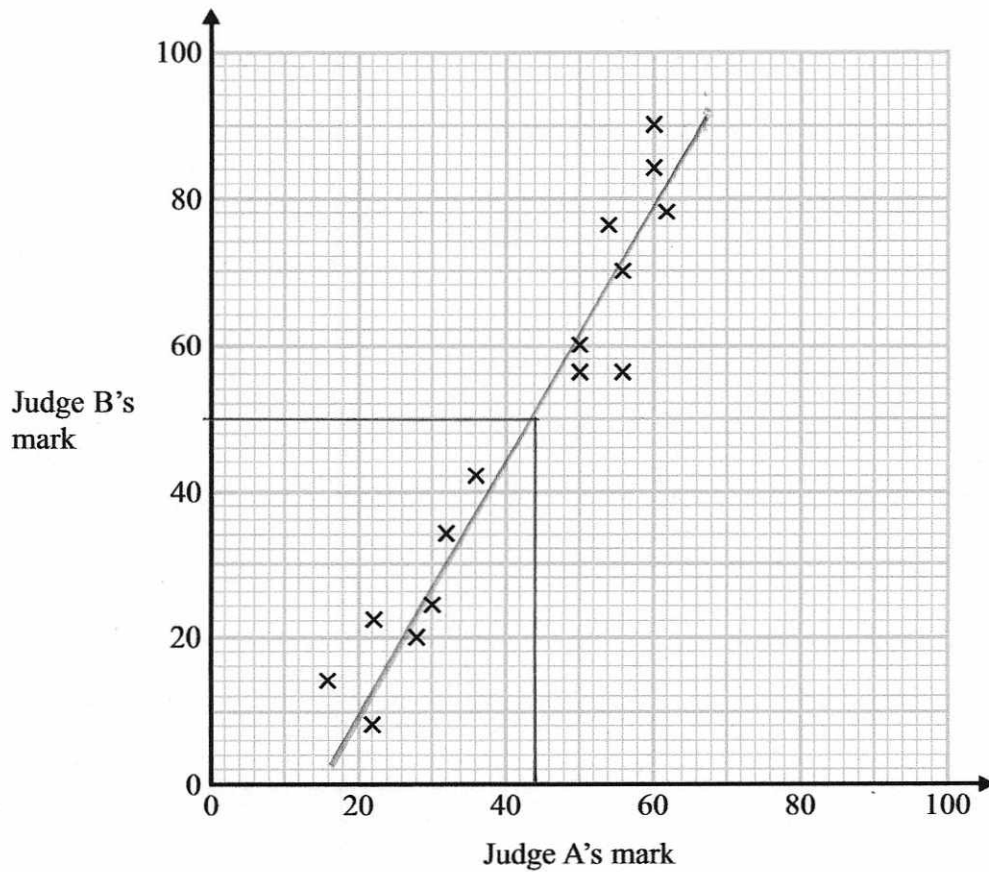
40

(Total for Question 6 is 3 marks)

7 Some children took part in a piano competition.

Each child was given a mark from Judge A and from Judge B.

The scatter graph below shows some of this information.



(a) Describe the correlation.

positive
(1)

Judge A gives 44 marks to another child.

(b) Use the scatter graph to estimate Judge B's mark for this child.

50 marks
(2)

(Total for Question 7 is 3 marks)

8

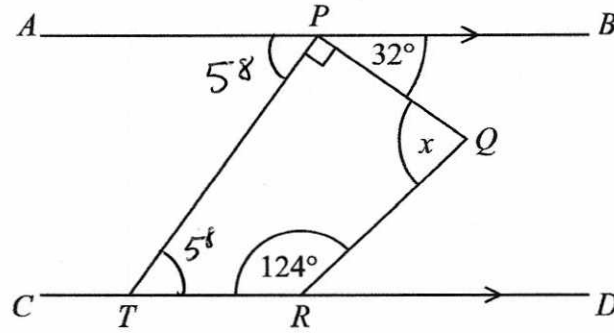


Diagram **NOT**
accurately drawn

APB is parallel to *CTRD*.

PQRT is a quadrilateral.

Work out the size of the angle marked *x*.

You must show your working.

$$\begin{aligned} \text{APT} &= 180 - 90 - 32 && \text{(Angles on a straight line)} \\ &= 58^\circ \end{aligned}$$

$$\text{PTR} = 58^\circ \quad \text{(alternate angles)}$$

$$\begin{aligned} x &= 360 - 90 - 124 - 58 \\ &= \underline{\underline{88^\circ}} \end{aligned}$$

88°

(Total for Question 8 is 4 marks)

9 PQR is an isosceles triangle.

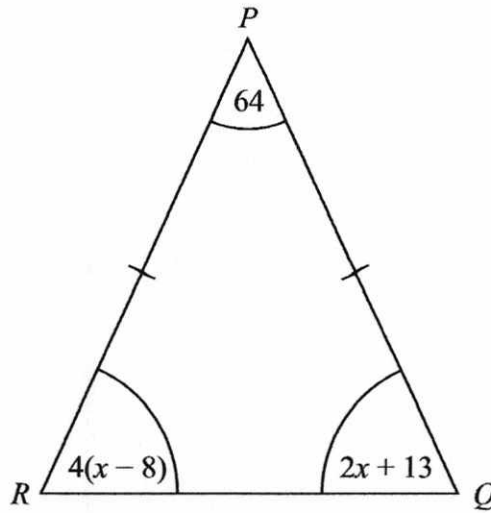


Diagram **NOT**
accurately drawn

$$PQ = PR$$

All the angles are in degrees.

Work out the value of x .

$$180 - 64 = 116$$

$$116 \div 2 = 58$$

$$\begin{array}{r} 2x + 13 = 58 \\ -13 \quad -13 \\ \hline \end{array}$$

$$2x = 45$$

$$x = 22.5^\circ$$

$$x = \underline{22.5^\circ}$$

(Total for Question 9 is 4 marks)

10 The equation $x^3 + 5x = 70$ 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.

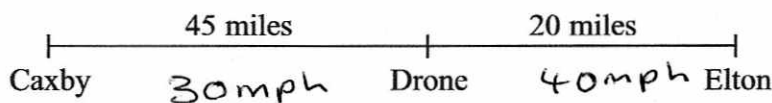
You must show all your working.

x	$x^3 + 5x$	comment.
3.5	$(3.5)^3 + 5(3.5)$ $= 60.375$	too low
3.7	$(3.7)^3 + 5(3.7)$ $= 69.153$	too low
3.8	73.872	too high
3.75	71.484375	too high

$x = 3.7$

(Total for Question 10 is 4 marks)

- 11 The distance from Caxby to Drone is 45 miles.
The distance from Drone to Elton is 20 miles.



Colin drives from Caxby to Drone.
Then he drives from Drone to Elton.

Colin drives from Caxby to Drone at an average speed of 30 mph.
He drives from Drone to Elton at an average speed of 40 mph.

Work out Colin's average speed for the whole journey from Caxby to Elton.

$$\frac{\text{Distance}}{\text{Speed}} = \text{Time}$$

Caxby \rightarrow Drone

$$\frac{45}{30} = 1.5 \text{ hours}$$

Drone \rightarrow Elton

$$\frac{20}{40} = 0.5 \text{ hours}$$

$$\begin{aligned} \text{Total Time} &= 1.5 + 0.5 = 2 \\ \text{Total Distance} &= 65 \text{ miles} \\ \text{Speed} &= \frac{65}{2} = 32.5 \text{ mph} \end{aligned}$$

32.5 mph

(Total for Question 11 is 3 marks)

- 12 Simplify fully $(x+5)^2 - (x-5)^2$

$$((x+5)(x+5)) - ((x-5)(x-5))$$

$$(x^2 + 5x + 5x + 25) - (x^2 - 5x - 5x + 25)$$

$$(x^2 + 10x + 25) - (x^2 - 10x + 25)$$

$$x^2 + 10x + 25 - x^2 + 10x - 25$$

20x

20x

(Total for Question 12 is 3 marks)

13 (a) Factorise $3y^2 + 2y$

$$\frac{y(3y + 2)}{(1)}$$

(b) Expand and simplify $(x - 9)(x + 2)$

$$x^2 + 2x - 9x - 18$$

$$\frac{x^2 - 7x - 18}{(2)}$$

(c) (i) Solve $6k + 5 < 20$

$$-5 \quad -5$$

$$6k < 15$$

$$k < \frac{15}{6}$$

$$\frac{k < 2.5}{(3)}$$

(ii) n is an integer and $6n + 5 < 20$

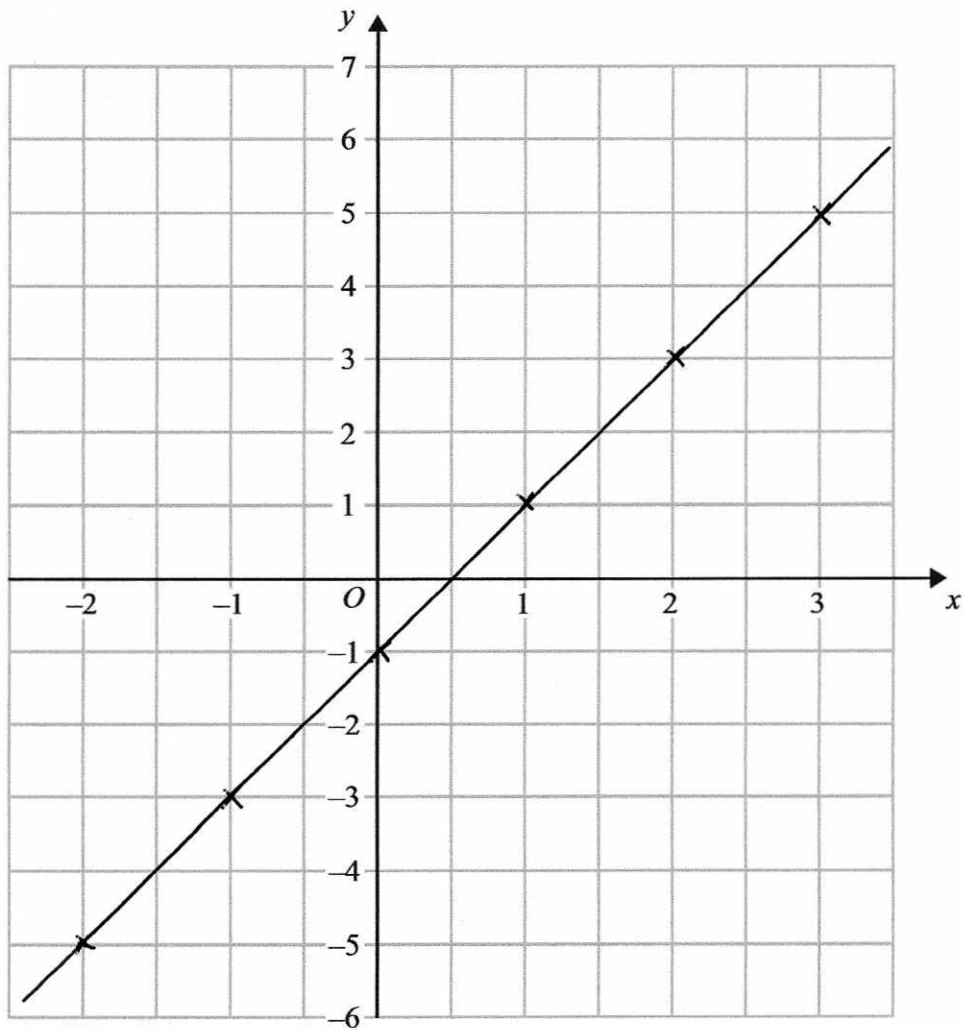
Write down the largest possible value of n

$$\frac{2}{(3)}$$

(Total for Question 13 is 6 marks)

14 On the grid, draw the graph of $y = 2x - 1$ for values of x from -2 to 3

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



(Total for Question 14 is 3 marks)

*15 The diagram shows the floor plan of Jill's dining room.

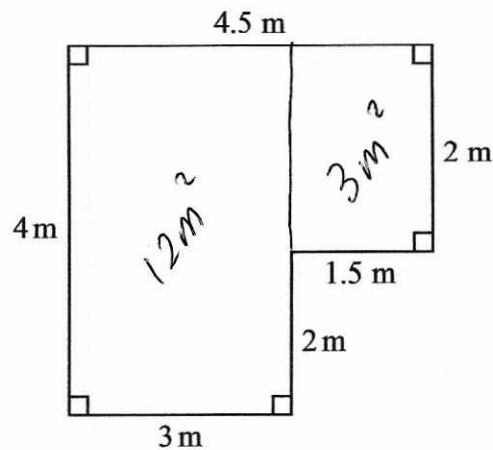


Diagram NOT accurately drawn

Jill is going to cover the floor with wooden floorboards.

The floorboards are sold in packs.

One pack of floorboards will cover 2.25 m^2 .

Work out how many packs Jill needs.

You must show all your working.

$$\begin{aligned} \text{Total Area} &= 4 \times 3 + 1.5 \times 2 \\ &= \underline{\underline{15 \text{ m}^2}} \end{aligned}$$

$$\frac{15}{2.25} = 6.\dot{6}$$

so 7 packs

(Total for Question 15 is 4 marks)

16 Faisal weighed 50 pumpkins.

The grouped frequency table gives some information about the weights of the pumpkins.

Weight (w kilograms)		Frequency	
$0 < w \leq 4$	2X	11	22
$4 < w \leq 8$	6X	23	138
$8 < w \leq 12$	10X	14	140
$12 < w \leq 16$	14X	2	28

Work out an estimate for the mean weight.

$$\frac{328}{50} = 6.56 \text{ kg}$$

6.56 kg

(Total for Question 16 is 4 marks)

17 Write down the value of

(i) 4^{-2}

$$16^{-1}$$

$$\frac{1}{16}$$

$$\frac{1}{16}$$

(ii) $64^{\frac{1}{3}}$

$$\sqrt[3]{64}$$

$$4$$

(Total for Question 17 is 2 marks)

18 Make t the subject of the formula $m = \frac{t+1}{t-3}$

$$m(t-3) = t+1$$

$$mt - 3m = t + 1$$

$$mt = t + 1 + 3m$$

$$mt - t = 1 + 3m$$

$$t(m-1) = 1 + 3m$$

$$t = \frac{1 + 3m}{m-1}$$

$$t = \frac{1 + 3m}{m-1}$$

(Total for Question 18 is 4 marks)

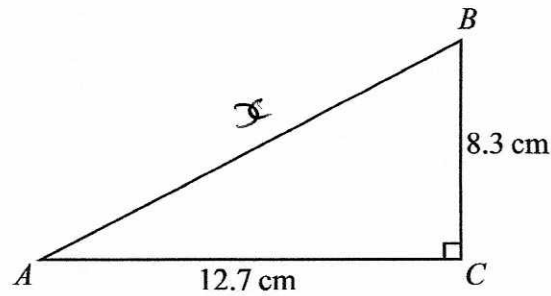


Diagram NOT
accurately drawn

- (a) Calculate the length of AB .
Give your answer correct to one decimal place.

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

$$12.7^2 + 8.3^2 = x^2$$

$$230.18 = x^2$$

$$x = \sqrt{230.18}$$

$$= 15.17168415$$

15.2

cm

(3)

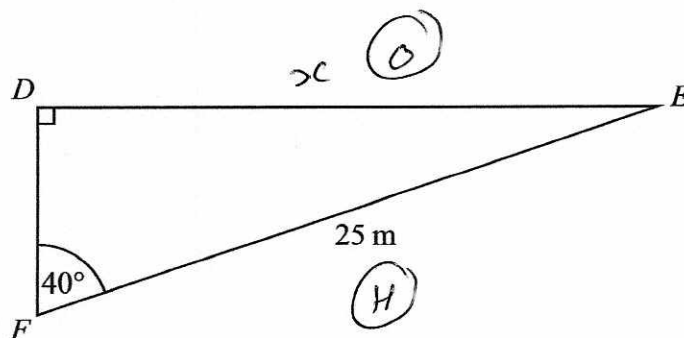


Diagram NOT
accurately drawn

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

$$\sin x = \frac{O}{H}$$

$$\sin(40) = \frac{x}{25}$$

$$x = 25 \times \sin(40)$$

$$= 16.06969024$$

16.1

m

(3)

(Total for Question 19 is 6 marks)

20 Martin bought a computer for £1200

At the end of each year the value of the computer is depreciated by 20%.

After how many years will the value of the computer be £491.52?

You must show your working.

$$1200 \times 0.8 = 960$$

$$960 \times 0.8 = 768$$

$$\text{Ans} \times 0.8 = 614.4$$

$$\text{Ans} \times 0.8 = 491.52$$

4

(Total for Question 20 is 3 marks)

21 The table shows the number of students in each year group at a college.

Year group	Number of students
1	182
2	140
3	98
Total	420

The college secretary took a stratified sample of 135 students, by year group.

Work out the number of year 2 students in her sample.

$$\frac{140}{420} \times 135$$

45

(Total for Question 21 is 2 marks)

22 In a sale, all normal prices are reduced by 20%

- (a) The normal price of a television set is 485 euros.
Work out the sale price of the television set.

$$0.8 \times 485$$

388 euros
(3)

- (b) In the sale, the normal price of a tablet computer is reduced by 79 euros.
Work out the normal price of the tablet computer.

$$\begin{array}{r} 79 \\ \times 5 \\ \hline 395 \end{array} = 20\%$$
$$\begin{array}{r} 395 \\ \times 5 \\ \hline 1975 \end{array} = 100\%$$

395 euros
(3)

(Total for Question 22 is 6 marks)

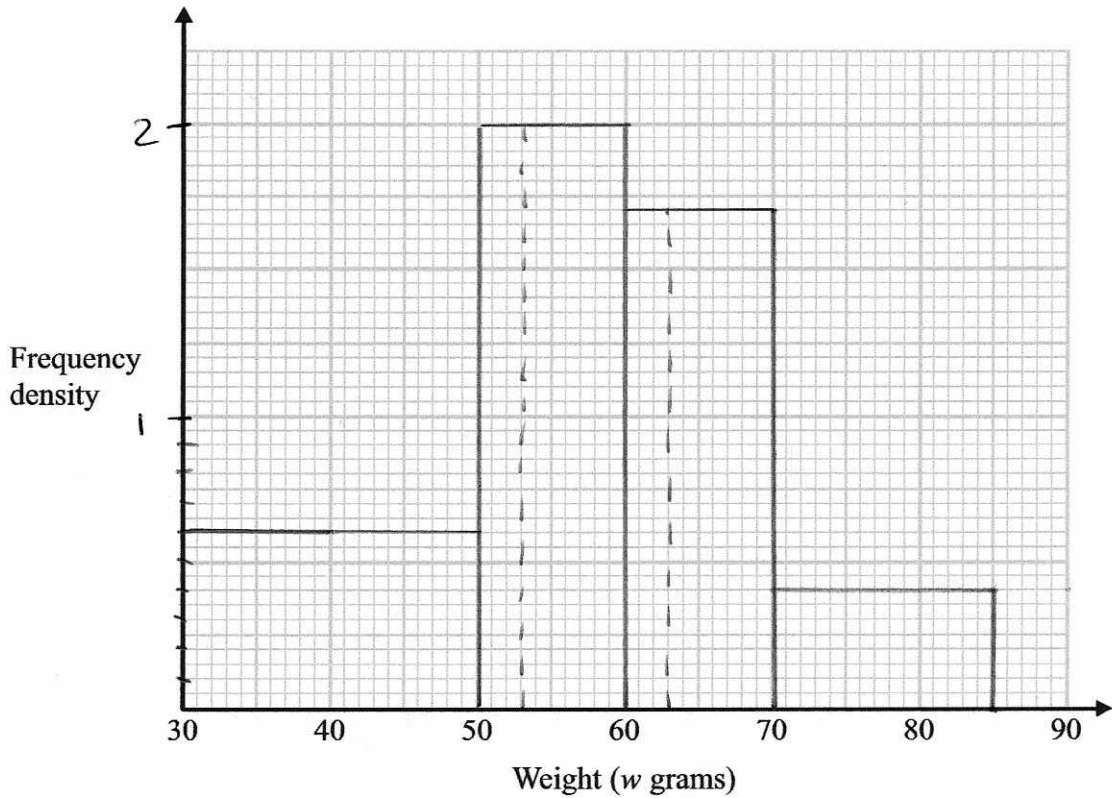
23 Billy keeps chickens.

The table shows information about the weights, in grams, of eggs produced by the chickens.

Weight (w grams)	$30 < w \leq 50$	$50 < w \leq 60$	$60 < w \leq 70$	$70 < w \leq 85$
Number of eggs	12	20	17	6

$F \cdot d$ 0.6 2 1.7 0.4

(a) On the grid, draw a histogram for this information.



(3)

Medium eggs weigh between 53 grams and 63 grams.

(b) Work out an estimate for the number of medium eggs produced.

$$\cancel{7} \times 2 + \cancel{3} \times 1.7$$

$$= \underline{\underline{19.1}}$$

19

(3)

(Total for Question 23 is 6 marks)

24 Solve $x^2 - 17x - 56 = 0$

Give your solutions correct to 2 decimal places.

$$a = 1 \quad b = -17 \quad c = -56$$

$$x = \frac{-(-17) \pm \sqrt{(-17)^2 - 4(1)(-56)}}{2(1)}$$

$$\underline{x = 19.82}, \quad \underline{x = -2.82}$$

(Total for Question 24 is 3 marks)

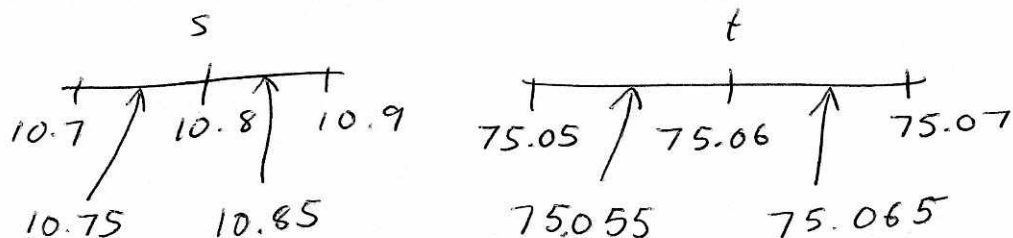
*25 $p = \sqrt{\frac{s}{t}}$

$s = 10.8$ correct to 1 decimal place.

$t = 75.06$ correct to 2 decimal places.

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

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



$$\text{upper } p = \sqrt{\frac{10.85}{75.055}}$$

$$= 0.3802113301$$

$$\text{lower } p = \sqrt{\frac{10.75}{75.065}}$$

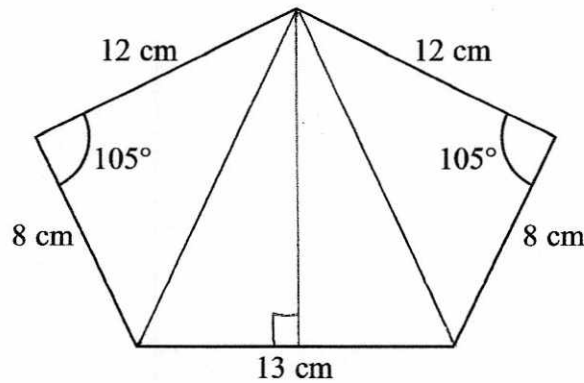
$$= 0.3784299389$$

Both round to 0.38 (2dp)

(Total for Question 25 is 5 marks)

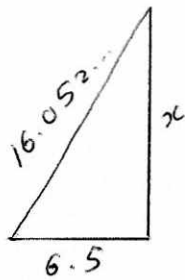
26 The diagram shows a pentagon.

Diagram NOT accurately drawn



Work out the area of the pentagon.
Give your answer correct to 3 significant figures.

$$\begin{aligned}
 a^2 &= b^2 + c^2 - 2bc \cos A \\
 &= (8)^2 + (12)^2 - 2(8)(12) \cos (105) \\
 &= 257.6932567 \\
 a &= 16.05282706
 \end{aligned}$$



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 b^2 &= c^2 - a^2 \\
 x^2 &= (16.052)^2 - 6.5^2 \\
 x^2 &= 215.44\dots \\
 x &= 14.6779\dots
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of middle triangle} &= \frac{1}{2}(13)(14.6779) \\
 &= 95.40690538
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of side triangles} &= 2 \left(\frac{1}{2}(8)(12) \sin(105) \right) \\
 &= 92.728879\dots
 \end{aligned}$$

$$"95.4069" + "92.728879"$$

188 cm²

(Total for Question 26 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS