Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Centre Number | Candidate Number

Time 1 hour 30 minutes

Paper reference **1MA1/3H**

Mathematics

PAPER 3 (Calculator)

Higher Tier

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator, Formulae Sheet (enclosed). 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.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- Good luck with your examination.

Turn over

P66381A

1/1/1/1/1/

Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

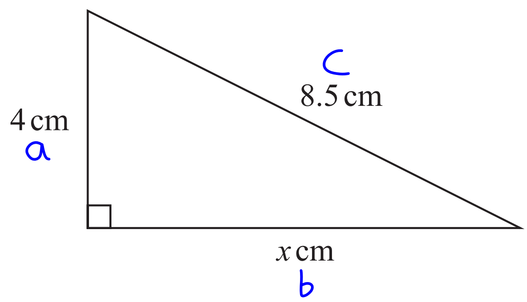
If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a right-angled triangle.



Work out the value of x.

$a^2 + b^2 = c^2$ ← Pythagoras' Theorem can be used to find the missing side in a right-angled triangle

$b^2 = c^2 - a^2$ ← Labelling the sides on the triangle. c is the longest side and the other two can be a and b. Subtracting a^2 from both sides to get b^2 on its own

$x = \sqrt{8.5^2 - 4^2}$ ← Square rooting both sides makes b the subject. Substituting in the values

$x =$ ....7.5........

(Total for Question 1 is 2 marks)

2 $T = 4m^2 - 11$

(a) Work out the value of T when $m = -3$

$4(-3)^2 - 11$ ← Substituting -3 for m

$T =$ 25

(2)

(b) Make p the subject of the formula $d = 3p + 4$

$d - 4 = 3p$ ← Subtracting 4 from both sides

Dividing both sides by 3 →

$\frac{d-4}{3} = p$

(2)

(Total for Question 2 is 4 marks)

3 Rick, Selma and Tony are playing a game with counters.

Rick has some counters.
Selma has twice as many counters as Rick.
Tony has 6 counters less than Selma.

In total they have 54 counters.

the number of counters Rick has : the number of counters Tony has = 1 : p

Work out the value of p.

$R + 2R + 2R - 6 = 54$ ← Let R be the number of counters Rick has. Selma has twice as many as Rick so must have 2R. Tony has 6 less than Selma so must have 2R - 6. Adding the expressions for the numbers of counters Rick, Selma and Tony have must equal to 54 as this is the total number of counters

$5R = 60$ ← Collecting like terms and adding 6 to both sides

$R = 12$ ← Dividing both sides by 5 finds that Rick has 12 counters

12×2 ← This works out that Selma has 24 counters

$24 - 6$ ← This works out that Tony has 18 counters

$12 : 18$ ← Writing the ratio of the number of counters Rick has to the number of counters Tony has

$18 \div 12$ ← Dividing both sides by 12 simplifies the ratio to have 1 part on the left. The right side also needs to be divided by 12

$p =$ 1.5

(Total for Question 3 is 5 marks)

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4 Jo is going to buy 15 rolls of wallpaper.

Here is some information about the cost of rolls of wallpaper from each of two shops.

Chic Decor	**Style Papers**
3 rolls for £36	Pack of 5 rolls normal price £70 12% off the normal price

Jo wants to buy the 15 rolls of wallpaper as cheaply as possible.

Should Jo buy the wallpaper from Chic Decor or from Style Papers?
You must show how you get your answer.

$15 \div 3$ ← Dividing the 15 rolls needed by the lots of 3 rolls from Chic Decor works out that 5 lots of 3 rolls need to be bought

$5 \times 36 = 180$ ← Each lot of 3 rolls cost £36 so multiplying this cost by the 5 lots needed works out that the 15 rolls will cost £180 from Chic Decor

$15 \div 5$ ← Dividing the 15 rolls needed by the packs of 5 rolls from Style Papers works out that 3 packs of 5 rolls need to be bought

3×70 ← Each pack of 5 rolls cost £70 so multiplying this cost by the 3 packs needed works out that the 15 rolls will cost £210 from Style Papers before the discount

$210 \times \frac{100-12}{100} = 184.8$ ← 100% is the full cost. Subtracting 12% expresses the percentage it decreases to when 12% is taken off the cost. Putting this over 100 converts it into a fraction. When the £210 is multiplied by this fraction, it is reduced by 12%. This works out that the cost of the 15 rolls will cost £184.80 after the discount

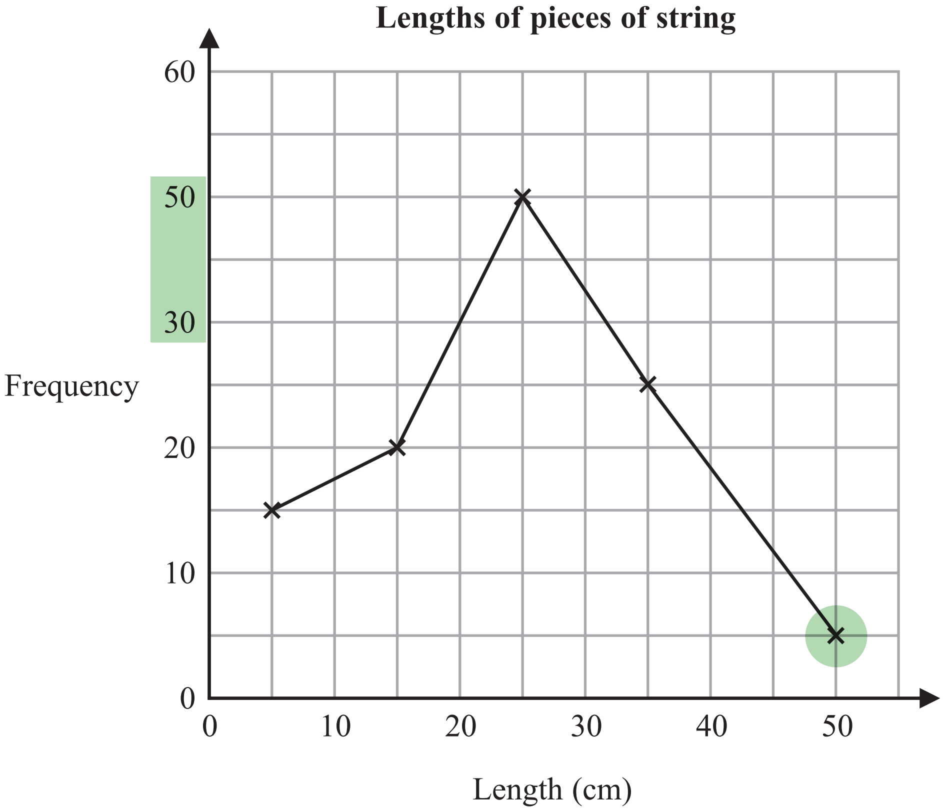
Chic Decor ← The cost of 15 rolls from Chic Decor is £180 and the cost of 15 rolls from Style Papers is £184.80. It is cheaper from Chic Decor

(Total for Question 4 is 4 marks)

5 The table gives information about the lengths, in cm, of some pieces of string.

Length (t cm)	Frequency
$0 < t \leqslant 10$	15
$10 < t \leqslant 20$	20
$20 < t \leqslant 30$	50
$30 < t \leqslant 40$	25
$40 < t \leqslant 50$	5

Amos draws a frequency polygon for the information in the table.



Write down **two** mistakes that Amos has made.

1 Last point is incorrect

All of the points should be plotted at the midpoints of each length interval. It should be plotted at the length of 45cm as this is the midpoint of 40 and 50

2 The frequency scale misses out 40

The scale goes up in 10s but skips from 30 to 50

(Total for Question 5 is 2 marks)

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6 Jessica runs for 15 minutes at an average speed of 6 miles per hour.
She then runs for 40 minutes at an average speed of 9 miles per hour.

It takes Amy 45 minutes to run the same total distance that Jessica runs.

Work out Amy's average speed.
Give your answer in miles per hour.

$s \; ^{d} \; t$ ← Writing the formula triangle for speed, distance and time. From the formula triangle, speed = distance ÷ time. Amy's time is given but not the distance so this needs to be calculated first

$6 \times \frac{15}{60} = 1.5$

$9 \times \frac{40}{60} = 6$

← From the formula triangle, distance = speed x time. The time needs to be in hours as the unit of speed involves hours. There are 60 minutes in an hour so dividing the time in minutes by 60 converts it into hours

$1.5 + 6$ ← Adding the 1.5 miles Jessica ran in the first part and the 6 miles Jessica ran in the second part works out that her total distance was 7.5 miles. Amy also runs this distance

$7.5 \div \frac{45}{60}$ ← From the formula triangle, speed = distance ÷ time. The time needs to be in hours as the unit of speed involves hours. There are 60 minutes in an hour so dividing the time in minutes by 60 converts it into hours

........................10........................ miles per hour

(Total for Question 6 is 4 marks)

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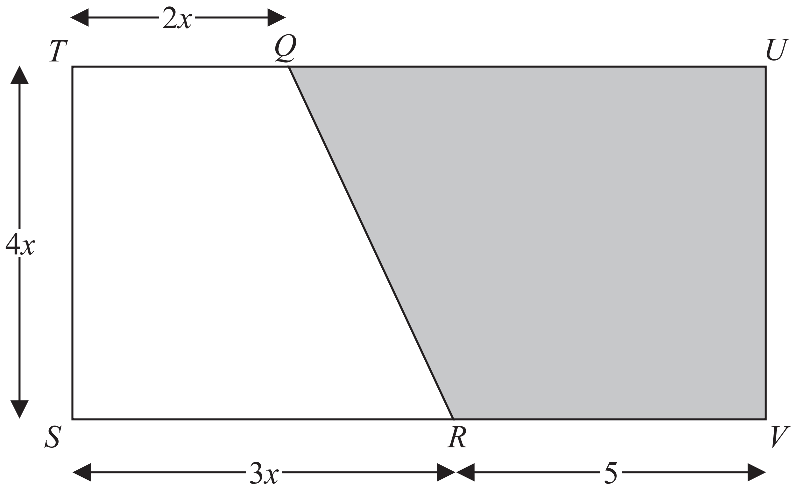
7 The diagram shows rectangle $STUV$.
TQU and SRV are straight lines.
All measurements are in cm.



The area of trapezium $QUVR$ is A cm²

Show that $A = 2x^2 + 20x$

$3x+5-2x=x+5$ ← The length of SV is 3x + 5. Subtracting the length of TQ leaves the length of QU

$A=\frac{1}{2}(x+5+5)\times 4x$ ← Area of trapezium = 1/2 (a + b)h, where a and b are the parallel sides and h is the distance between them. a is length QU, b is length RV and h is length TS

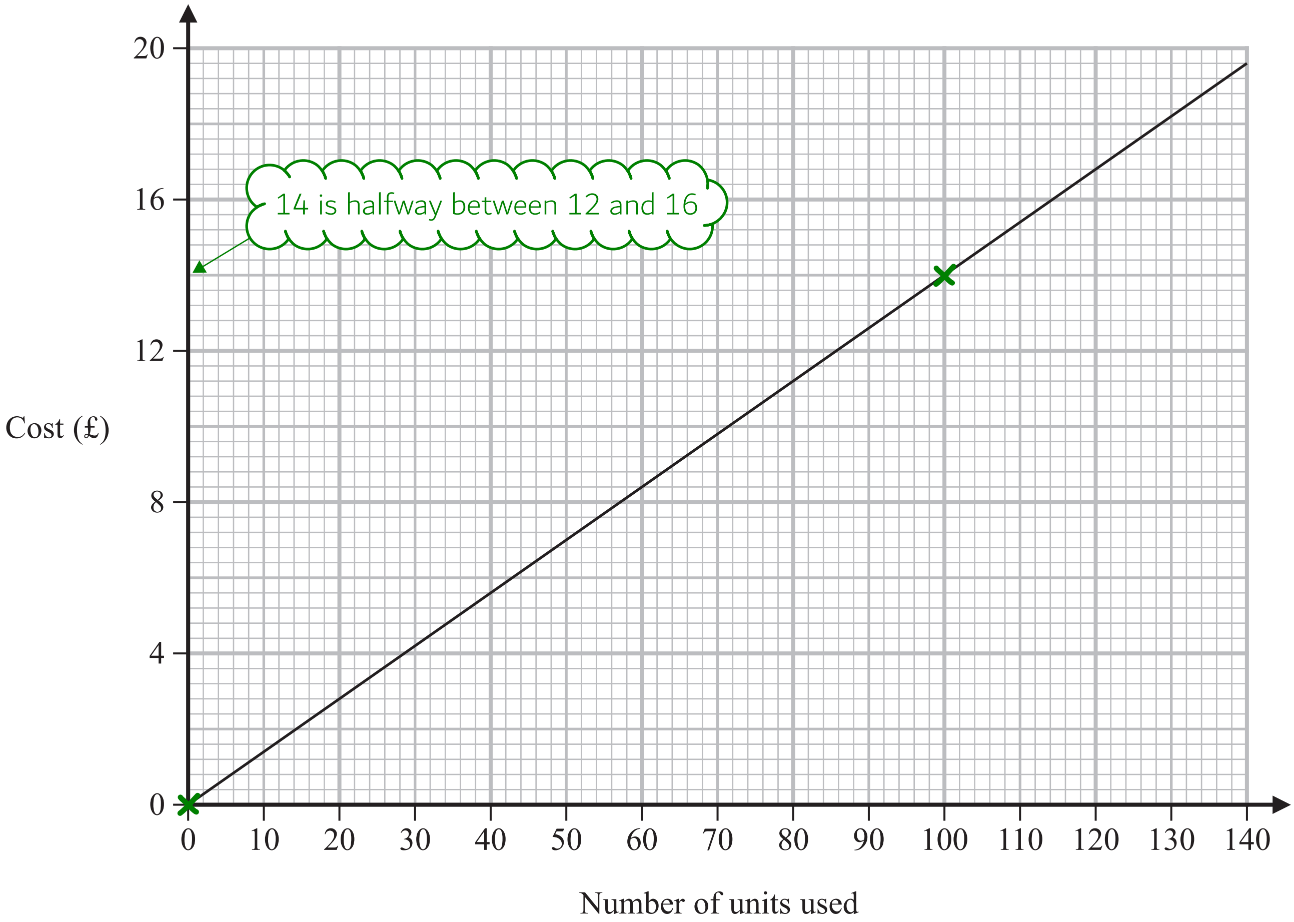
$=2x(x+10)$ ← Simplifying by multiplying the 1/2 by 4x and collecting collecting like terms in the bracket

$=2x^2+20x$ ← Expanding the bracket

(Total for Question 7 is 3 marks)

8 An electricity company charges the same fixed amount for each unit of electricity used.

David uses this graph to work out the total cost of the electricity he has used.



(a) Work out the gradient of the straight line.

$\frac{14-0}{100-0}$

Gradient = (change in y)/(change in x). From (0 , 0) to (100 , 14), the change in y is 14 - 0 and the change in x is 100 - 0

0.14

(2)

(b) What does the gradient of this line represent?

Cost per unit

To work out the gradient, the cost was divided by the number of units. Per means to divide

(1)

(Total for Question 8 is 3 marks)

9 (a) Express $\sqrt{\dfrac{10^{360}}{10^{150} \times 10^{90}}}$ as a power of 10

$\sqrt{\dfrac{10^{360}}{10^{240}}}$ ← $a^x \times a^y = a^{x+y}$ so $10^{150} \times 10^{90} = 10^{150+90} = 10^{240}$

$\sqrt{10^{120}}$ ← $a^x \div a^y = a^{x-y}$ so $10^{360} \div 10^{240} = 10^{360-240} = 10^{120}$

Square rooting halves the power. $120 \div 2 = 60$

10^{60}

(3)

Liam was asked to express $(12^{50})^2$ as a power of 12

Liam wrote $(12^{50})^2 = 12^{50^2} = 12^{2500}$

Liam's method is wrong.

(b) Explain why.

$(12^{50})^2 = 12^{50 \times 2}$ $(a^x)^y = a^{xy}$

(1)

(Total for Question 9 is 4 marks)

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10 Jane bought a new car three years ago.

At the end of the first year the value of the car had decreased by 12.5%
The value of the car then decreased by 10% each year for the next two years.

At the end of the three years, the value of the car was £17 010

Work out the value of the car when Jane bought it three years ago.

$$x \times \frac{100-12.5}{100} \times \left(\frac{100-10}{100}\right)^2 = 17010$$

Subtracting 12.5% from 100% expresses the percentage it decreased to at the end of the first year. Putting this over 100 converts it into a fraction. Multiplying by this fraction reduces by 12.5%. Subtracting 10% from 100% expresses the percentage it decreases to at the end of each of the next two years. Putting this over 100 converts it into a fraction. Multiplying by this fraction reduces by 10%. Raising it to the power of 2 applies the reduction twice. Let x be the original value. Multiplying x by these fractions must be equal to the value at the end of the three years

$$x = \frac{17010}{\frac{100-12.5}{100} \times \left(\frac{100-10}{100}\right)^2}$$

Dividing both sides by everything x was multiplied by makes x the subject and finds the original value

£ 24000

(Total for Question 10 is 3 marks)

.CG Maths.

11 Rayheem has

16 shirts
5 pairs of jeans
3 jackets

Rayheem chooses an outfit to wear.
An outfit is 1 shirt, 1 pair of jeans and 1 jacket.

Work out how many different outfits Rayheem can choose.

$16 \times 5 \times 3$ ← The product rule for counting can be used. Multiplying the number of possibilities of each individual event works out how many possibilities for all the events

240

(Total for Question 11 is 2 marks)

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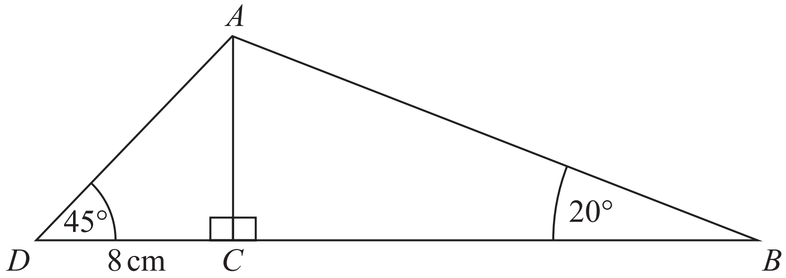
12 *ABC* and *ACD* are right-angled triangles.



$DC = 8$ cm
Angle $ADC = 45°$
Angle $ABC = 20°$

Work out the length of *AB*.
Give your answer correct to 3 significant figures.

S O H C A H T O A ← Right-angled trigonometry can be used in right-angled triangle ACD to work out side AC. We have the adjacent and are looking for the opposite so A and O are ticked. Two ticks on TOA means that this formula triangle can be used

$\tan 45 \times 8 = 8$ ← From the formula triangle, opposite = (tan of the angle) x adjacent. So side AC is 8cm

S O H C A H T O A ← Right-angled trigonometry can be used in right-angled triangle ABC to work out side AB. We have the opposite and are looking for the hypotenuse so O and H are ticked. Two ticks on SOH means that this formula triangle can be used

$\frac{8}{\sin 20}$ ← From the formula triangle, hypotenuse = opposite/(sin of the angle)

The answer of 23.39... is rounded to 3 significant figures

23.4 .... cm

(Total for Question 12 is 3 marks)

13 **a** and **b** are vectors such that

$$\mathbf{a} = \begin{pmatrix} 2 \\ -3 \end{pmatrix} \quad \text{and} \quad 3\mathbf{a} - 2\mathbf{b} = \begin{pmatrix} 8 \\ -17 \end{pmatrix}$$

Find **b** as a column vector.

$3\times2-2x=8$ ← Starting with the x-components. The x-component of a is 2. Multiplying this by 3 as it is 3a. Let x be the x-component of b. Multiplying this by -2 as it is -2b. This must be equal to the x-component of the vector, which is 8

$-2x=8-6$ ← 3 x 2 = 6. Subtracting 6 from both sides to get the x term on its own

$x=2\div-2=-1$ ← 8 - 6 = 2. Dividing both sides by -2 to get x on its own. The x-component of b is -1

$3\times-3-2y=-17$ ← Next dealing with the y-components. The y-component of a is -3. Multiplying this by 3 as it is 3a. Let y be the y-component of b. Multiplying this by -2 as it is -2b. This must be equal to the y-component of the vector, which is -17

$-2y=-17+9$ ← 3 x -3 = -9. Adding 9 to both sides to get the y term on its own

$y=-8\div-2=4$ ← -17 + 9 = -8. Dividing both sides by -2 to get y on its own. The y-component of b is 4

$$\begin{pmatrix} -1 \\ 4 \end{pmatrix}$$

(Total for Question 13 is 3 marks)

14 (a) Factorise fully $4p^2 - 36$

$4(p^2-9)$ ← 4 is the highest common factor of $4p^2$ and 36 so bringing this out as a factor, dividing both terms by it and leaving the result in a bracket

Factorising $p^2 - 9$ using difference of two squares. $A^2 - B^2 = (A + B)(A - B)$

$4(p+3)(p-3)$

(2)

(b) Show that $(m + 4)(2m - 5)(3m + 1)$ can be written in the form $am^3 + bm^2 + cm + d$ where a, b, c and d are integers.

$2m^2-5m+8m-20$ ← Expanding the first two brackets

$(2m^2+3m-20)(3m+1)$ ← Simplifying by collecting like terms then writing multiplied by the third bracket

$6m^3+2m^2+9m^2+3m-60m-20$ ← Expanding the next two brackets

$6m^3+11m^2-57m-20$ ← Simplifying by collecting like terms

(3)

(Total for Question 14 is 5 marks)

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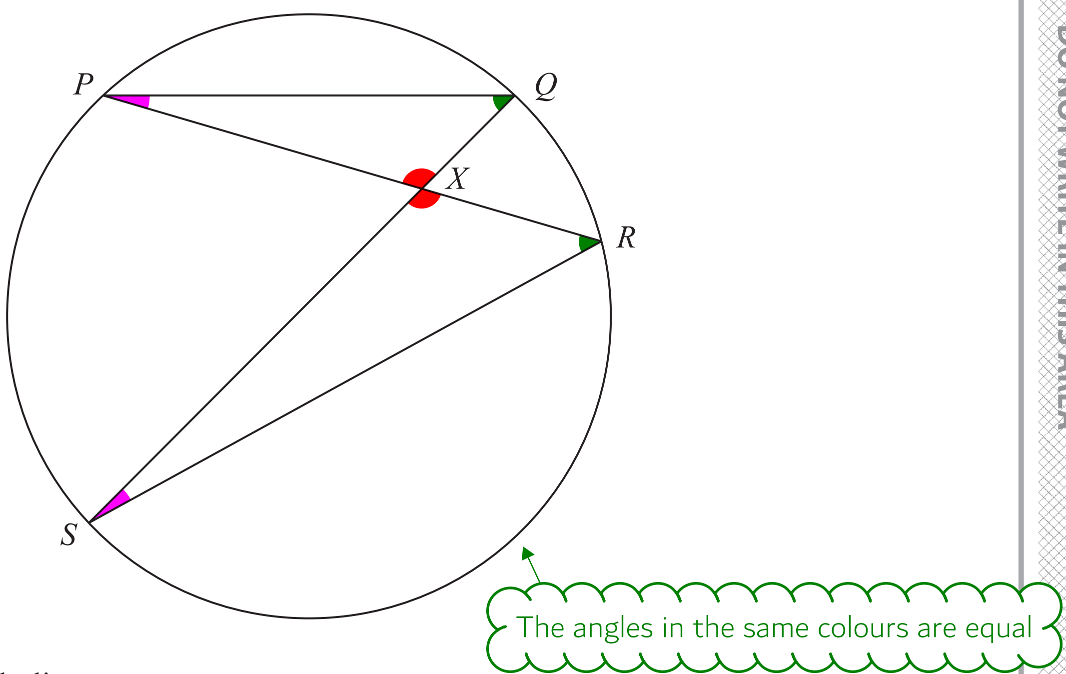
15 P, Q, R and S are four points on a circle.



PXR and SXQ are straight lines.

Prove that triangle PQX and triangle SRX are similar.

Angles PXQ = RXS as vertically opposite angles are equal

Angles QPR = QSR and PQS = PRS as angles in the same segment are equal

Therefore triangles PQX and SRX are similar as all of their angles are the same

Similar triangles have all the same angles

(Total for Question 15 is 3 marks)

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16 $p = \sqrt{\frac{2e}{f}}$

$e = 6.8$ correct to 1 decimal place.

$f = 0.05$ correct to 1 significant figure.

Work out the upper bound for the value of p.
Give your answer correct to 3 significant figures.
You must show all your working.

$$\sqrt{\frac{2\left(6.8+\frac{0.1}{2}\right)}{0.05-\frac{0.01}{2}}}$$

The upper bound of e and the lower bound of f (as dividing by less makes it greater) is needed to get the upper bound of p. The upper bound of e is found by adding half of the resolution. The resolution is 0.1 as it is correct to 1 decimal place and the 1st decimal place goes up in 0.1s. The lower bound of f is found by subtracting half of the resolution. The resolution is 0.01 as it is correct to 1 significant figure and the first significant figure is in the 2nd decimal place, which goes up in 0.01s

The answer of 17.44... is rounded to 3 significant figures

17.4

(Total for Question 16 is 3 marks)

17 The table gives information about the distances, in miles, that some Year 10 students live from school.

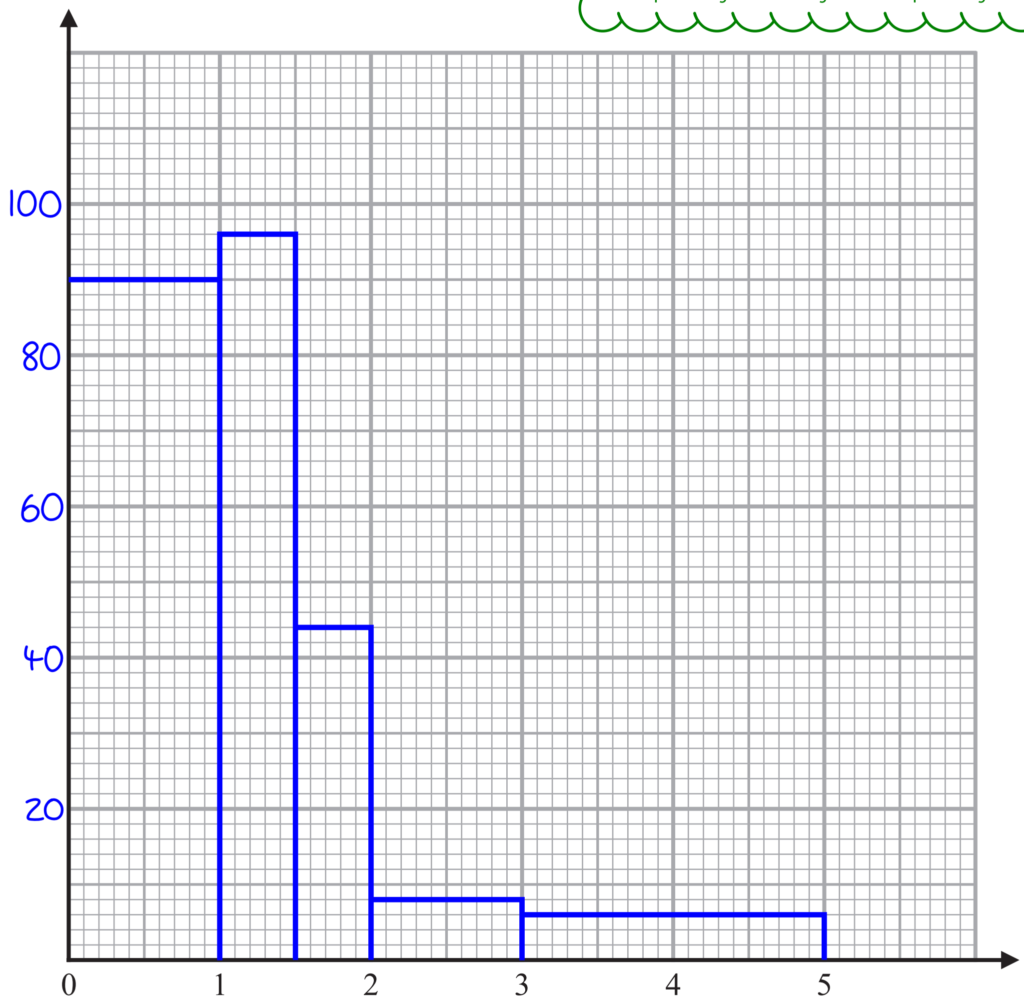
Distance (d miles)	Frequency
$0 < d \leqslant 1.0$	90
$1.0 < d \leqslant 1.5$	48
$1.5 < d \leqslant 2.0$	22
$2.0 < d \leqslant 3.0$	8
$3.0 < d \leqslant 5.0$	12

90 ← 90 ÷ (1.0 - 0) = 90
96 ← 48 ÷ (1.5 - 1.0) = 96
44 ← 22 ÷ (2.0 - 1.5) = 44
8 ← 8 ÷ (3.0 - 2.0) = 8
6 ← 12 ÷ (5.0 - 3.0) = 6

From the formula triangle,
frequency density = frequency ÷ class width

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

Frequency density



Distance (d miles)

c F d ← Frequency on a histogram is the area of each box.
So frequency = class width x frequency density. Writing it as a formula triangle

96÷6=16
20÷10=2

The highest frequency density is 96 and the vertical scale has 6 large boxes. Dividing the 96 by the 6 boxes works out that each large box could represent 16. This is an unusual scale so it is rounded up to 20. Dividing the 20 by the 10 small boxes in each large box works out that each small box is worth 2

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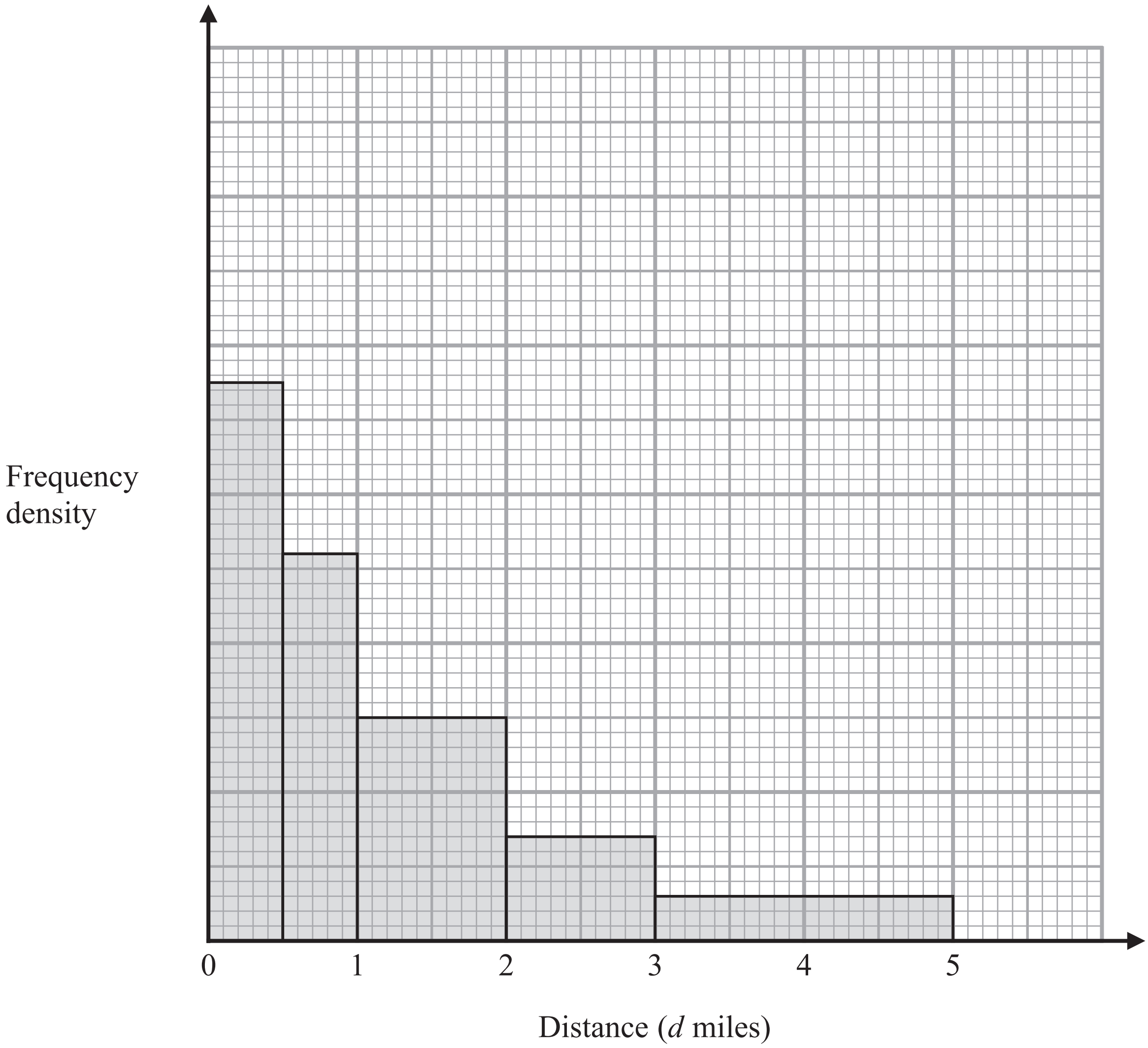
The histogram below shows information about the distances, in miles, that some Year 11 students live from school.



The number of Year 11 students who live between 1 and 2 miles from school is n.

(b) Find an expression, in terms of n, for the number of Year 11 students who live between 3 and 5 miles from school.

cFd ← Frequency on a histogram is the area of each box. So frequency = class width x frequency density. Writing it as a formula triangle

$n \div 1 = n$ ← From the formula triangle, frequency density = frequency ÷ class width. The frequency for the third bar is n and its class width is 1. Therefore its frequency density is n

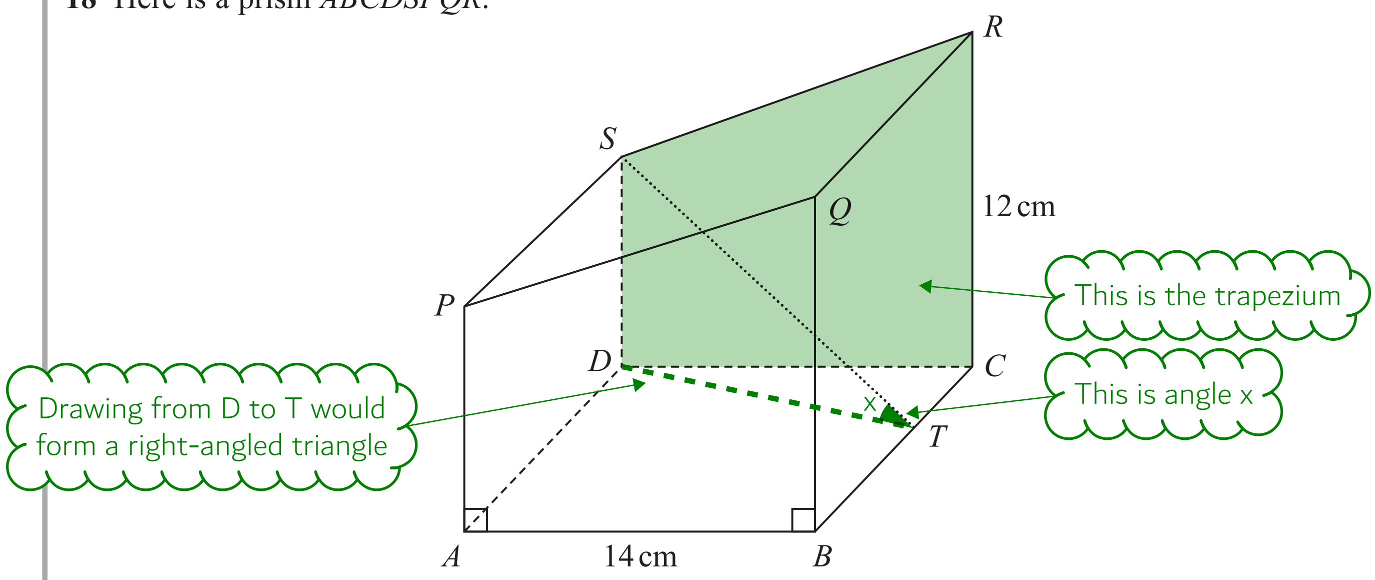
$\frac{3}{15} n \times 2$ ← The frequency density of n is 15 small boxes up the vertical scale. The frequency density of the last bar, which represents between 3 and 5 miles, is 3 small boxes up the vertical scale. Therefore it's frequency density must be 3/15 of n. Frequency = class width x frequency density, so multiplying this frequency density by the class width of the last bar, which is 2

$0.4n$

(2)

(Total for Question 17 is 5 marks)

18 Here is a prism *ABCDSPQR*.



The base *ABCD* of the prism is a square of side 14 cm
T is the point on *BC* such that *BT* : *TC* = 4 : 3

The cross section of the prism is in the shape of a trapezium of area 147 cm^2
CR = 12 cm

Find the size of the angle between the line *ST* and the base *ABCD*.
Give your answer correct to 1 decimal place.

$14 \div 7$ ← There are 7 parts in total in the ratio. Dividing the length of BC (which must be 14cm as all the lengths on a square are equal) by the 7 parts parts which represent it works out that the value of 1 part of the ratio is 2

$2 \times 3 = 6$ ← Multiplying the value of 1 part of the ratio by the 3 parts which represent TC works out that length TC is 6cm

$a^2 + b^2 = c^2$ ← Pythagoras' Theorem can be used to work out the missing side DT in right-angled triangle CDT. DT is the longest side so is represented by c

$DT = \sqrt{14^2 + 6^2} = 2\sqrt{58}$ ← Square rooted both sides to find c and substituted in the values. This is the length of DT

The method continues on the next page

30.6 °

The answer of 30.57... is rounded to 1 decimal place

(Total for Question 18 is 5 marks)

$\frac{1}{2}(12+SD)\times 14=147$ ← Area of trapezium = 1/2 (a + b)h, where a and b are the parallel sides and h is the distance between them. a is side RC, which is 12cm, and b is side SD. h is side CD, which is 14cm as it is the side of the square base. The expression of the area must be equal to 147 as this is the area of the trapezium

$SD=\frac{147}{\frac{1}{2}\times 14}-12=9$ ← Rearranged to find SD by dividing both sides by everything the bracket was multiplied by then subtracting 12 from both sides

$S\,\overset{\checkmark}{O}\,H\;C\,\overset{\checkmark}{A}\,H\;T\,\overset{\checkmark}{O}\,\overset{\checkmark}{A}$ ← Right-angled trigonometry can be used to find the angle x, which is the angle between the line ST and the base ABCD. In right-angled triangle SDT, we have the opposite and the adjacent so ticking O and A. There are two ticks on the TOA formula triangle so this one can be used

$\tan x=\frac{9}{2\sqrt{58}}$ ← Tan of the angle involves the angle. From the TOA formula triangle, tan of the angle = opposite/adjacent. The opposite is side SD and the adjacent is side DT

$x=\tan^{-1}\left(\frac{9}{2\sqrt{58}}\right)$ ← Rearranging to find angle x by doing the inverse tan of both sides

19 Show that $\frac{3x}{x+2} - \frac{2x+1}{x-2} - 1$ can be written in the form $\frac{ax+b}{x^2-4}$

where a and b are integers.

$$\frac{3x(x-2)}{(x+2)(x-2)} - \frac{(2x+1)(x+2)}{(x+2)(x-2)} - \frac{1(x+2)(x-2)}{(x+2)(x-2)}$$

Making all the denominators the same so that they can be subtracted to get a single fraction. Whatever the denominator is multiplied by, the numerator needs to be multiplied by the same amount to keep the fractions equivalent

$$\frac{3x^2-6x-(2x^2+4x+x+2)-(x^2-2x+2x-4)}{x^2-2x+2x-4}$$

Expanding the brackets and combining into one fraction by subtracting the numerators. The denominator stays the same. Putting the numerators in brackets when they are subtracted as the negative applies to all of it

$$\frac{3x^2-6x-2x^2-4x-x-2-x^2+2x-2x+4}{x^2-4}$$

Expanding the brackets with the negatives. Collecting like terms to simplify the denominator

$$\frac{-11x+2}{x^2-4}$$

Collecting like terms to simplify the numerator. It is now in the desired form

(Total for Question 19 is 4 marks)

20 The profit made by a shop increases each year.

The profit made by the shop in year n is £P_n

Given that the profit made by the shop in the next year is £P_{n+1} then

$$P_{n+1} = aP_n + 800 \text{ where } a \text{ is a constant.}$$

The table shows the profit made by the shop in 2018 and in 2019

Year	2018	2019
Profit	£24 000	£29 600

Work out the profit predicted to be made by the shop in 2021

$29600 = a(24000) + 800$ ← P_{n+1} means the profit in the next year after P_n. So $P_{2019} = aP_{2018} + 800$

$\frac{29600 - 800}{24000} = a = 1.2$ ← Rearranged to find a by subtracting 800 from both sides then dividing both sides by 24000

$1.2(29600) + 800$ ← So the formula is $P_{n+1} = 1.2P_n + 800$. $P_{2020} = 1.2P_{2019} + 800$

$1.2(36320) + 800$ ← $P_{2021} = 1.2P_{2020} + 800$

£ 44384

(Total for Question 20 is 4 marks)

21 Ray has nine cards numbered 1 to 9

1	2	3	4	5	6	7	8	9

Ray takes at random three of these cards.

He works out the sum of the numbers on the three cards and records the result.

Work out the probability that the result is an even number.

EEE, EOO, OEO, OOE

Systematically listing out the outcomes which will result in an even result. E stands for even and O stands for odd

$$\frac{4}{9}\times\frac{3}{8}\times\frac{2}{7}+\frac{4}{9}\times\frac{5}{8}\times\frac{4}{7}+\frac{5}{9}\times\frac{4}{8}\times\frac{4}{7}+\frac{5}{9}\times\frac{4}{8}\times\frac{4}{7}$$

Even AND even AND even OR even AND odd AND odd OR odd AND even AND odd OR odd AND odd AND even. AND means to multiply the probabilities, OR means to add. There are 4 even and 5 odd numbers to begin with. There is 1 fewer card in total after each pick so the denominator goes down by 1 between each pick. There is 1 fewer even after an even is picked and 1 fewer odd after an odd is picked

$\frac{11}{21}$ ....

(Total for Question 21 is 4 marks)

22 **L** is the straight line with equation $y = 2x - 5$

C is a graph with equation $y^2 = 6x^2 - 25x - 8$

Using algebra, find the coordinates of the points of intersection of **L** and **C**.
You must show all your working.

$(2x-5)(2x-5)$ ← Working out y^2 in terms of x. Squaring both sides of $y = 2x - 5$ gives $y^2 = (2x - 5)^2$

$4x^2-10x-10x+25$ ← Expanding the brackets

$4x^2-20x+25=6x^2-25x-8$ ← Collecting like terms and simplifying then substituting for y^2 in the second equation

$0=2x^2-5x-33$ ← Bringing into the quadratic form $ax^2 + bx + c = 0$ so it can be solved. Subtracting $4x^2$, adding $20x$ and subtracting 25 from both sides

$\dfrac{-(-5)\pm\sqrt{(-5)^2-4\times2\times(-33)}}{2\times2}$ ← $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ ← Solving for x using the quadratic formula

$x=5.5$ or $x=-3$

$y=2(5.5)-5$ $=6$ or $y=2(-3)-5$ $=-11$ ← Substituting the values of x into the first equation to find the values of y

x-coordinate, y-coordinate

(5.5 , 6)

(-3 , -11)

(Total for Question 22 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS