

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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

Friday 8 November 2024

Morning (Time: 1 hour 30 minutes)

Paper
reference

1MA1/2F

Mathematics
PAPER 2: (Calculator)
Foundation Tier



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB or B pencil, eraser, calculator, Formulae Sheet (enclosed). Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **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.

Turn over ►

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.CG Maths.
Worked Solutions



Pearson

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 should be written in the exam.

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

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 Write 17% as a fraction.

Percentage is out of 100 → $\frac{17}{100}$

(Total for Question 1 is 1 mark)

2 Write 140 minutes in hours and minutes.

There are 60 minutes in an hour. 2 lots of 60 minutes is 120 minutes so 2 hours go into the 140 minutes with 20 minutes left over. Alternatively, entering $0^{\circ}140^{\circ}$ as a sexagesimal into the calculator gives $2^{\circ}20'0''$, which can be read as 2 hours and 20 minutes

..... 2 hours 20 minutes

(Total for Question 2 is 1 mark)

3 Write these numbers in order of size.
Start with the smallest number.

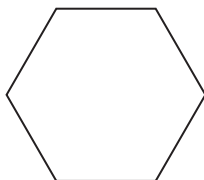
0.570 0.507 0.500 0.050

Adding 0s to write all the decimals to the same number of decimal places makes them easier to compare

..... 0.05, 0.5, 0.507, 0.57

(Total for Question 3 is 1 mark)

4 Write down the mathematical name of this polygon.



A 2D shape with 6 straight sides

..... Hexagon

(Total for Question 4 is 1 mark)

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5 Find the number that is exactly halfway between -2 and 8

-2 + 8

6 ÷ 2

Working out the mean of -2 and 8 works out that 3 is halfway between them. Mean can be worked out by adding them together then dividing by 2 (as there are 2 numbers)

3

(Total for Question 5 is 1 mark)

6 Jo uses beads to make bracelets. For each bracelet she uses 5 red beads and 7 white beads.

Jo has 52 red beads and 80 white beads.

Work out the greatest number of bracelets Jo can make.

You must show all your working.

52 ÷ 5 = 10.4

Dividing the 52 red beads by the 5 red beads needed for each bracelet works out that there are enough red beads for 10 bracelets

80 ÷ 7 = 11.4...

Dividing the 80 white beads by the 7 white beads needed for each bracelet works out that there are enough white beads for 11 bracelets

There are not enough red beads for 11 bracelets so 10 is the greatest number of bracelets which can be made

10

(Total for Question 6 is 3 marks)



7 Here are the ages, in years, of 8 children.

$$14 + 10 + 10 + 13 + 15 + 9 + 15 + 10$$

(a) Work out the mean age.

$$96 \div 8$$

Dividing the total age by the 8 children works out that the mean age is 12 years

Adding all the ages works out that the total age of all the children is 96 years

$$\dots\dots\dots 12 \dots\dots\dots \text{years}$$

(2)

(b) Work out the range of the ages.

$$15 - 9$$

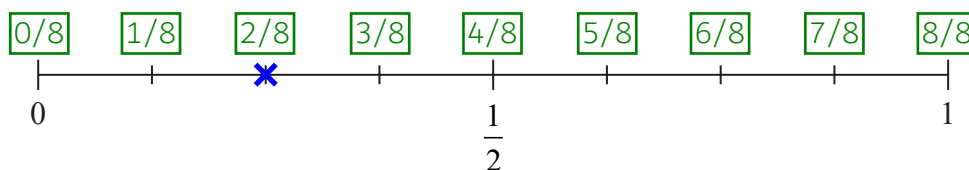
Range = largest - smallest

$$\dots\dots\dots 6 \dots\dots\dots \text{years}$$

(2)

One of the children is chosen at random.

(c) On the probability scale below, mark with a cross (×) the probability that this child has an age of 15



2 out of the 8 children has an age of 15

(1)

(Total for Question 7 is 5 marks)



8 Junaid says that 20 is a square number because $10^2 = 20$

(a) Is Junaid correct?

Give a reason for your answer.

No, $10^2 = 100$

2 as a power means to square the number, which means to multiply it by itself. $10 \times 10 = 100$, not 20. No whole number can be squared to give 20 so 20 is not a square number

(1)

Chloe says,

“When you divide an even number by an even number the answer is always an even number.”

(b) Write down an example to show that Chloe is wrong.

$2 \div 2 = 1$

2 is an even number as it is divisible by 2. Dividing 2 by 2 gives 1, which is not an even number. Even numbers end in 0, 2, 4, 6, 8

(1)

(Total for Question 8 is 2 marks)

9 There are 90 red counters and 150 yellow counters in a bag.

Write down the ratio of the number of red counters to the number of yellow counters.

Give your ratio in its simplest form.

$\frac{90}{150}$

Fractions simplify in a similar way to ratios. Putting the fraction $90/150$ into the calculator simplifies it to $3/5$, so the ratio $90 : 150$ must simplify to $3 : 5$

3 : 5

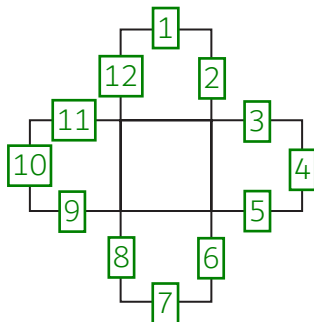
(Total for Question 9 is 2 marks)

10 Here is a square.



The square has a perimeter of 40 cm.

Five of these squares are used to make the shape below.



Work out the perimeter of this shape.

$40 \div 4$

Perimeter is the total of all the outside sides. There are 4 equal sides on the square so dividing its perimeter by 4 works out that each side is 10 cm

10×12

Multiplying the length of each side by the 12 outside sides of the shape works out that its perimeter is 120 cm

120

cm

(Total for Question 10 is 3 marks)

11 (a) Simplify $2x \times 3y$

Multiplication can be done in any order. $2 \times 3 = 6$ and $x \times y = xy$. Then $6 \times xy = 6xy$

$6xy$

(1)

(b) Simplify $3d - 4e + 2d + e$

Collecting like terms. $3d + 2d = 5d$ and $-4e + e = -3e$

$5d - 3e$

(2)

(Total for Question 11 is 3 marks)

12 180 tickets are sold for a concert.

60% of the tickets are child tickets.

The rest of the tickets are adult tickets.

The total cost of the 180 tickets is £1944

Each child ticket costs £8

Work out the cost of each adult ticket.

$$\frac{60}{100} \times 180 = 108$$

Putting the 60% over 100 converts it to a fraction, which finds that 60% of 180 is 108 when multiplied. So there are 108 child tickets

$$180 - 108 = 72$$

Subtracting the 108 child tickets from the 180 tickets works out that there are 72 adult tickets

$$108 \times 8$$

Multiplying the 108 child tickets by the £8 cost of each child tickets works out that the total cost of the child tickets is £864

$$1944 - 864$$

Subtracting the £864 total cost of the child tickets from the £1944 total cost of all the tickets works out that the total cost of the adult tickets is £1080

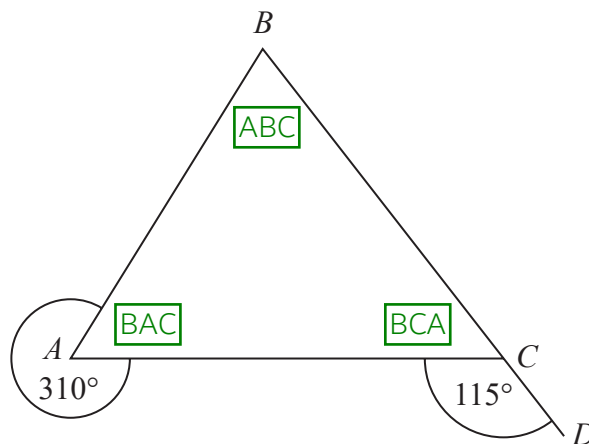
$$1080 \div 72$$

Dividing the £1080 total cost of the adult tickets by the 72 adult tickets works out that each adult ticket costs £15

£ 15

(Total for Question 12 is 4 marks)

13 ABC is a triangle.



BCD is a straight line.

Show that triangle ABC is isosceles.

Give a reason for each stage of your working.

$BAC = 360^\circ - 310^\circ = 50^\circ$, as there are 360° around a point

$BCA = 180^\circ - 115^\circ = 65^\circ$, as there are 180° around a point on a straight line

$ABC = 180^\circ - 50^\circ - 65^\circ = 65^\circ$, as they are 180° in a triangle

Subtracting angles BAC and BCA from 180° finds angle ABC

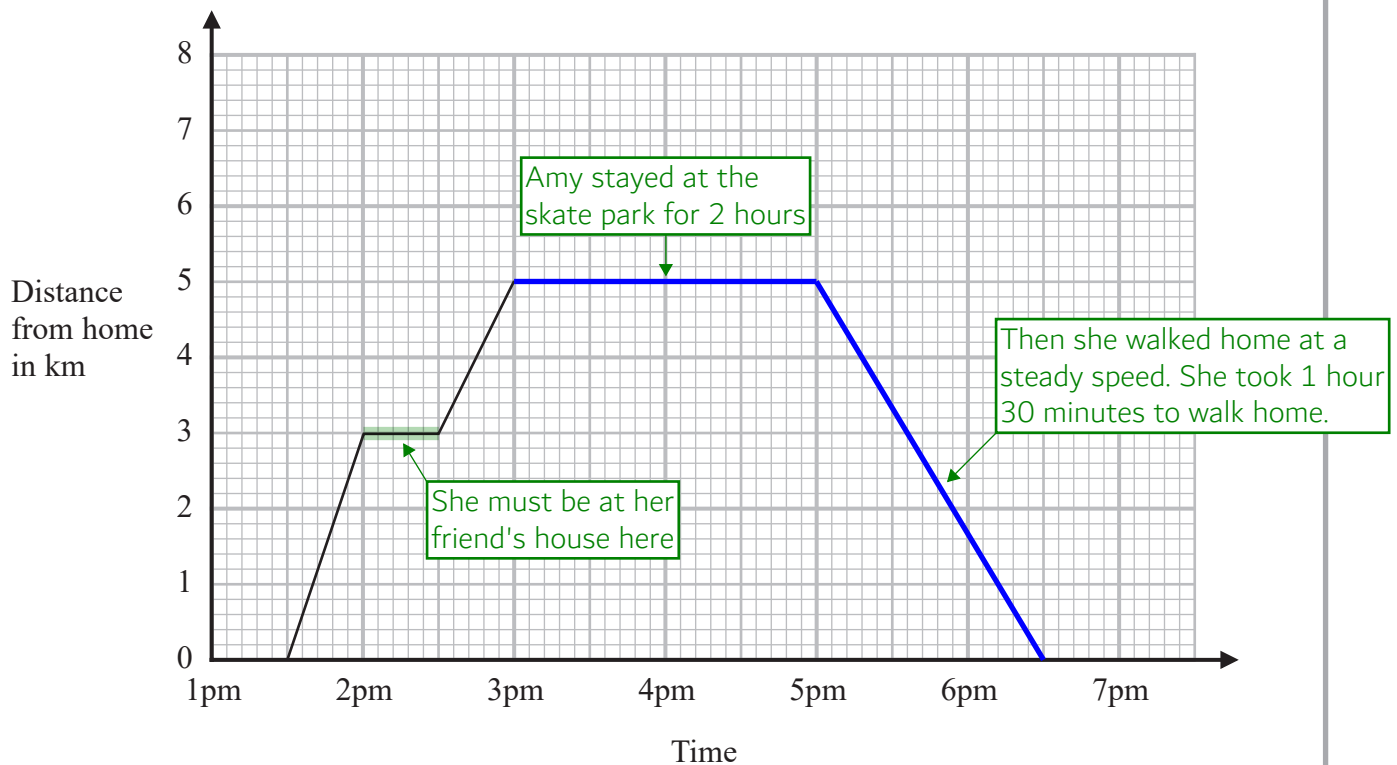
Two angles are equal so it is an isosceles triangle

Angles BCA and ABC are both 65°

(Total for Question 13 is 4 marks)

14 Amy walked from her home to the skate park.

The travel graph of Amy's walk to the skate park is shown below.



On the way to the skate park Amy stopped at her friend's house.

(a) How far is it from her friend's house to the skate park?

Her friend's house is 3 km from home. The skate park is 5 km from home. An additional 2 km was travelled from her friend's house to the skate park 2 km (1)

Amy stayed at the skate park for 2 hours.

Then she walked home at a steady speed.

She took 1 hour 30 minutes to walk home. ← 30 minutes is half an hour

(b) Complete the travel graph.

(2)

(Total for Question 14 is 3 marks)

- 15 A map has a scale of 1 : 25 000
On the map, a road has a length of 14 cm.

Work out the real length of the road.
Give your answer in kilometres.

$$14 \times 25000 \leftarrow \begin{array}{l} \text{From the scale, the 25000 is 25000 times greater than the 1 so the actual distance} \\ \text{is 25000 times the distance on the map. So the actual distance is 350000 cm} \end{array}$$

$$350000 \div 100 \leftarrow \begin{array}{l} \text{There are 100 cm in 1 m. So dividing the 350000 cm by 100 converts it into 3500 m} \end{array}$$

$$3500 \div 1000 \leftarrow \begin{array}{l} \text{There are 1000 m in 1 km. So dividing the 3500 m by 1000 converts it into 3.5 km} \end{array}$$

.....3.5..... kilometres

(Total for Question 15 is 3 marks)

- 16 Aisha has two boxes of sweets, box A and box B.

In box A, there are only 10 red sweets and 30 green sweets.
In box B, there are only 7 red sweets and 18 green sweets.

Aisha is going to take at random a sweet from box A and a sweet from box B.

Which box gives Aisha the greater probability of taking a red sweet, box A or box B?
You must show how you get your answer.

$$10 + 30 \leftarrow \begin{array}{l} \text{Adding the 10 red sweets and 30 green sweets in box} \\ \text{A works out that there are 40 sweets in total in box A} \end{array}$$

$$\frac{10}{40} \times 100 = 25 \leftarrow \begin{array}{l} \text{10 out of the 40 sweets in box A are red. Expressing this as a fraction} \\ \text{then multiplying by 100 to convert it to a percentage (as percentages} \\ \text{are easy to compare) finds that 25\% of the sweets in box A are red} \end{array}$$

$$7 + 18 \leftarrow \begin{array}{l} \text{Adding the 7 red sweets and 18 green sweets in box} \\ \text{B works out that there are 25 sweets in total in box B} \end{array}$$

$$\frac{7}{25} \times 100 = 28 \leftarrow \begin{array}{l} \text{7 out of the 25 sweets in box B are red. Expressing this as a fraction} \\ \text{then multiplying by 100 to convert it to a percentage (as percentages} \\ \text{are easy to compare) finds that 28\% of the sweets in box B are red} \end{array}$$

$$\text{Box B} \leftarrow \begin{array}{l} \text{28\% is more than 25\%} \end{array}$$

(Total for Question 16 is 3 marks)

17 Last year Emma's car insurance cost £285

This year her car insurance costs 7% less.

(a) Work out the cost of Emma's car insurance this year.

$$\frac{7}{100} \times 285$$

Putting the 7% over 100 converts it into a fraction. Multiplying the £285 by this fraction finds that 7% of £285 is £19.95

$$285 - 19.95$$

Decreasing the £285 by the value of 7% (£19.95) works out that the cost reduces to £265.05

$$\begin{array}{r} \text{£} \quad 265.05 \\ \hline (3) \end{array}$$

Peter sells bikes.

Each month he is paid £1700 plus a bonus.

The bonus is 5% of the total value of the bikes he sells that month.

Last month Peter was paid £2100

(b) Work out the total value of the bikes he sold last month.

$$2100 - 1700$$

Subtracting the £1700 from the £2100 works out that the bonus was £400 last month

$$400 \div 5$$

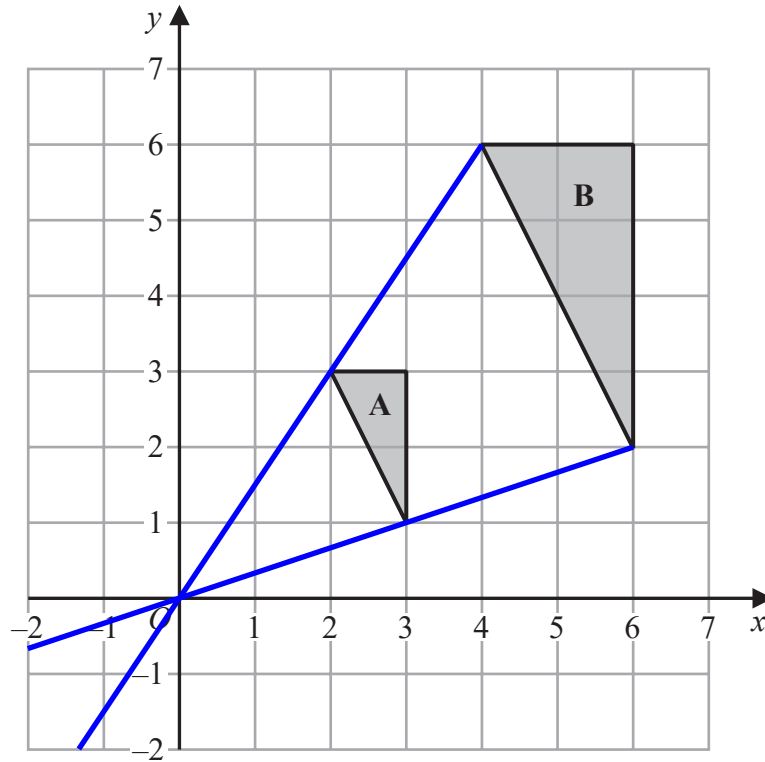
The £400 is 5% of the total value of the bikes. So dividing the £400 by 5 works out that 1% of the total value of the bikes is £80

$$80 \times 100$$

Multiplying the the value of 1% by 100 works out that 100% of the value of the bikes is £8000

$$\begin{array}{r} \text{£} \quad 8000 \\ \hline (3) \end{array}$$

(Total for Question 17 is 6 marks)



Describe fully the single transformation that maps triangle A onto triangle B.

Enlargement, scale factor 2, centre $(0, 0)$

It is an enlargement as it has changed size. The scale factor is 2 as all the sides have been multiplied by 2 from A to B. Drawing straight lines through the corners of both shapes and seeing where they cross finds that the centre is $(0, 0)$

(Total for Question 18 is 2 marks)

19 (a) Factorise fully $15w^2 - 5w$

5w is the highest common factor of $15w^2$ and $5w$. Bringing 5w out as a factor, dividing both terms by 5w and leaving the result in a bracket

$$5w(3w - 1)$$

(2)

(b) On the number line below, show the set of values of x for which $-2 < x \leq 4$

The shaded in circle means that it can be equal. The empty circle means that it cannot be equal



(2)

(Total for Question 19 is 4 marks)

20 Use your calculator to work out the value of

$$\sqrt{\frac{208.3 - 15.7}{5.694 + 1.8^2}}$$

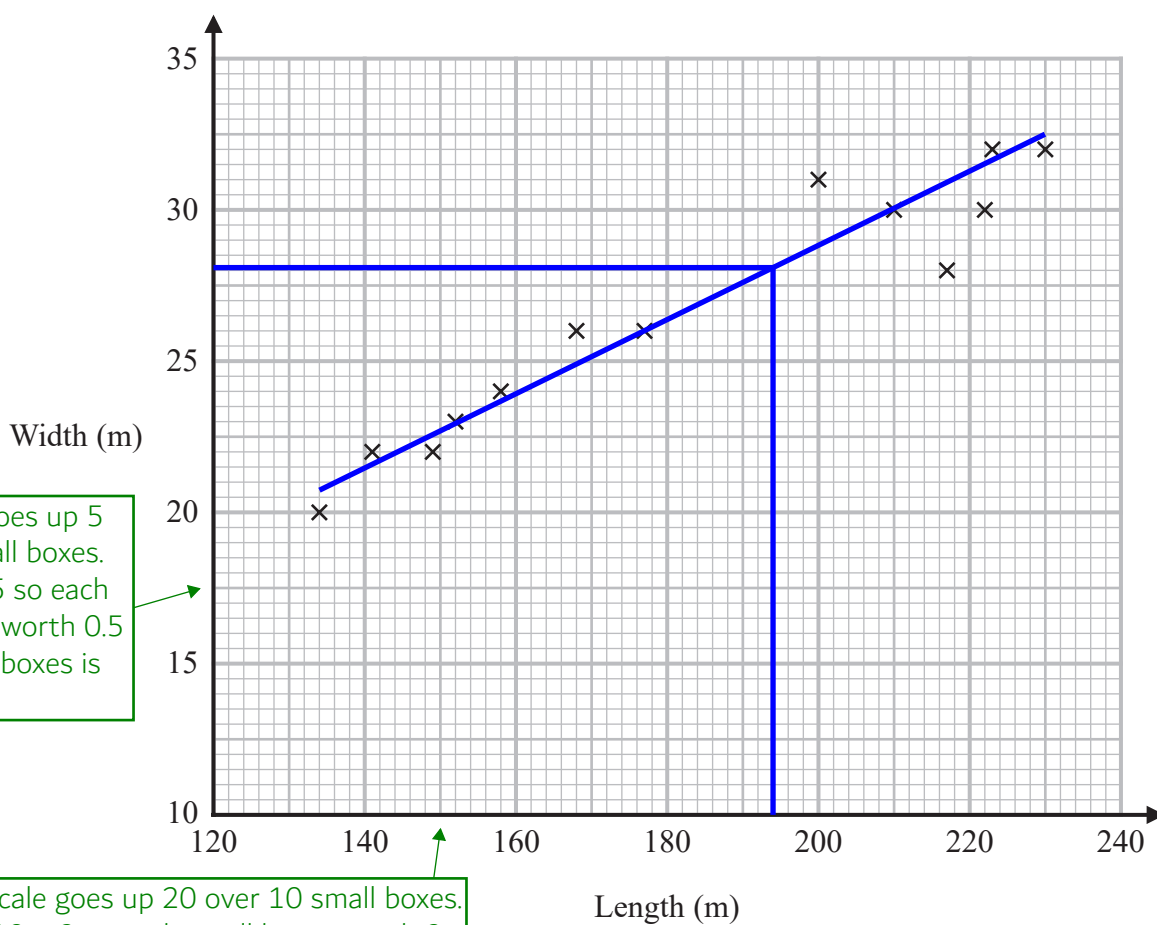
Write down all the digits on your calculator display.

Typing it into the calculator exactly as it is above

4.643069317

(Total for Question 20 is 2 marks)

- 21 The scatter graph shows information about some ships.
It shows the length and the width of each ship.



This scale goes up 5 over 10 small boxes. $5 \div 10 = 0.5$ so each small box is worth 0.5 and 2 small boxes is worth 1

This scale goes up 20 over 10 small boxes. $20 \div 10 = 2$ so each small box is worth 2

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

As the length increases, the width also increases \rightarrow Positive (1)

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

A different ship has a length of 194 metres.

- (c) Use your line of best fit to find an estimate for the width of this ship.

Reading up from 194 metres to the line of best fit then across \rightarrow 28 metres (1)

(Total for Question 21 is 3 marks)

Choci bar

200 g

£3.50

London**Choci bar**

360 g

7.20 Swiss francs

Zurich

In London, a 200 g Choci bar costs £3.50

In Zurich, a 360 g Choci bar costs 7.20 Swiss francs.

The exchange rate is £1 = 1.25 Swiss francs.

In which city is the Choci bar the better value for money, in London or in Zurich?

You must show how you get your answer.

$$350 \div 200 = 1.75$$

£3.50 is 350p. Dividing the 350p by the 200 g works out that it costs 1.75p per gram in London

$$7.20 \div 1.25$$

Dividing the 7.20 Swiss francs by 1.25 uses the exchange rate to convert it to £5.76, which is 576p

$$576 \div 360 = 1.6$$

Dividing the 576p by the 360 g works out that it costs 1.6p per gram in Zurich

Zurich

1.6p per gram is less than 1.75p per gram. So it is cheaper per gram in Zurich

(Total for Question 22 is 3 marks)

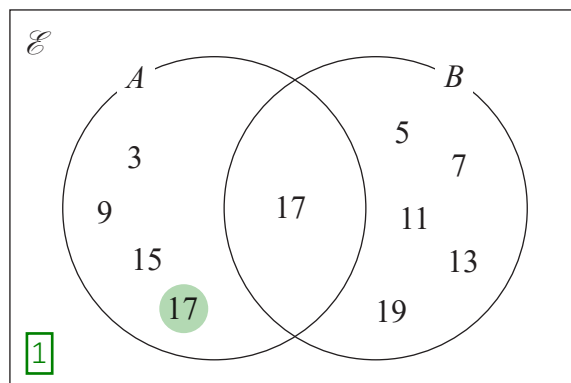
23 $\mathcal{E} = \{\text{odd numbers between 0 and 20}\}$

$A = \{3, 9, 15, 17\}$

$B = \{5, 7, 11, 13, 17, 19\}$

Tom was asked to draw a Venn diagram for this information.

Here is his answer.



Write down two things Tom should do to make his answer fully correct.

1 Get rid of the 17 in only A

.....

2 Include 1

.....

1 is an odd number between 0 and 20 and it is not included in the diagram

(Total for Question 23 is 2 marks)

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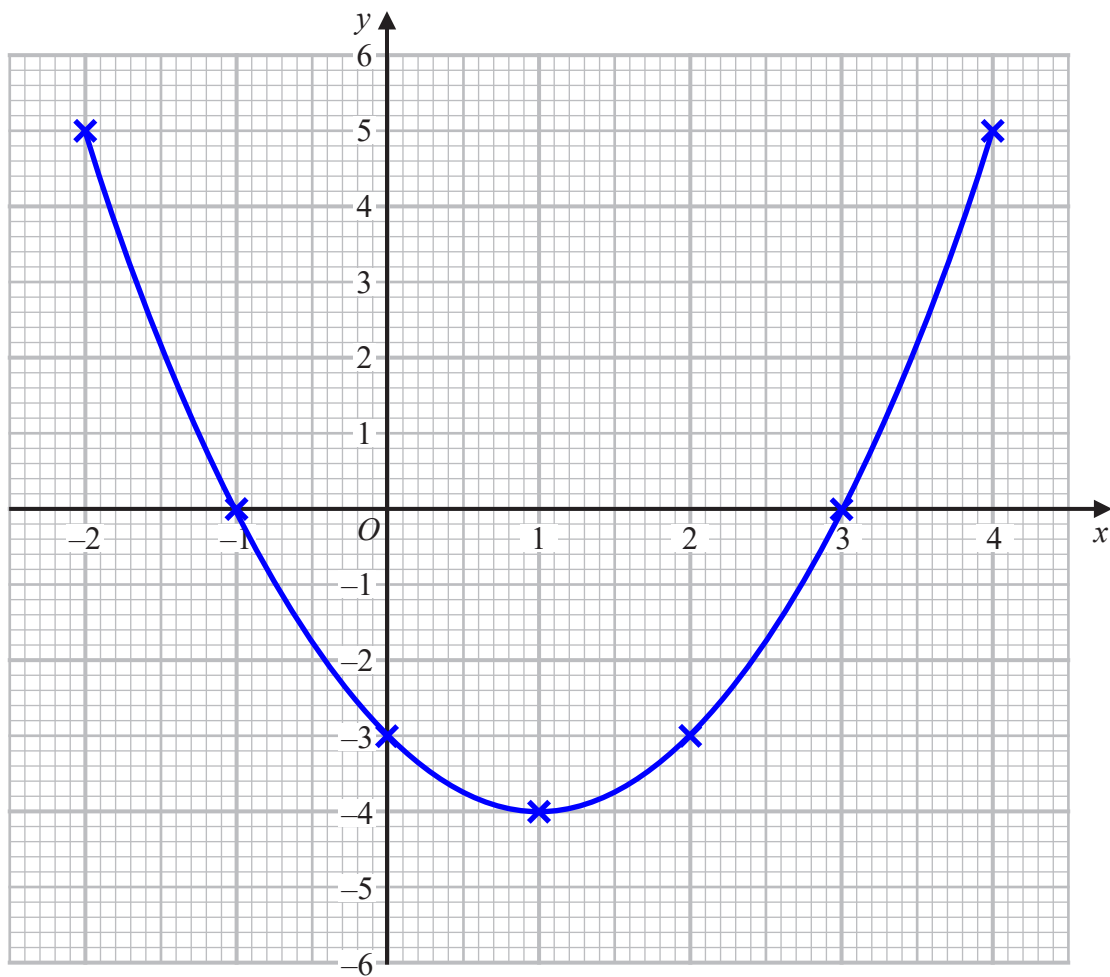
24 (a) Complete the table of values for $y = x^2 - 2x - 3$

Use table mode on the calculator. Define $f(x) = x^2 - 2x - 3$. For the table range, start: -2, end: 4, step: 1

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

(2)

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



Plotting the points then joining up with a curve

(2)

(Total for Question 24 is 4 marks)



- 25 The cost of a first class stamp increased from 76p to 85p.
The cost of a second class stamp increased from 65p to 66p.

Filip says,

“The percentage increase in the cost of a first class stamp is more than 7 times the percentage increase in the cost of a second class stamp.”

Is Filip correct?

You must show all your working.

$$\frac{85 - 76}{76} \times 100 = 11.8\ldots$$

Subtracting the 76p from the 85p expresses the increase in the cost of a first class stamp. Putting this over the original 76p expresses the increase as a fraction. Multiplying this by 100 converts it to a percentage increase

$$\frac{66 - 65}{65} \times 100 = 1.5\ldots$$

Subtracting the 65p from the 66p expresses the increase in the cost of a second class stamp. Putting this over the original 65p expresses the increase as a fraction. Multiplying this by 100 converts it to a percentage increase

$$1.5\ldots \times 7 = 10.7\ldots$$

This works out that 7 times the percentage increase of a second class stamp is 10.7..%

Yes

11.8...% is more than 10.7...%, which is 7 times the 1.5...%

(Total for Question 25 is 4 marks)

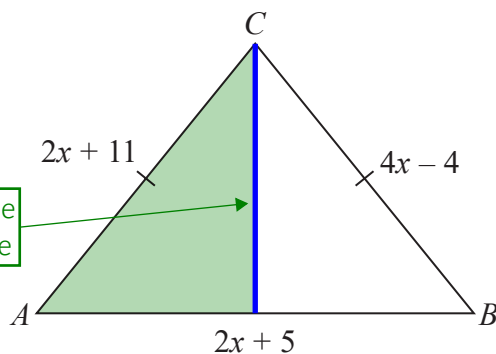
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26 The diagram shows triangle ABC .



In the diagram, all measurements are in centimetres.

$$AC = BC$$

The perimeter of the triangle is 72 cm.

Work out the area of the triangle.

$$2x + 11 = 4x - 4 \quad \leftarrow AC = BC$$

$$11 = 2x - 4 \quad \leftarrow \text{Subtracting } 2x \text{ from both sides gets all the } x \text{ on the same side}$$

$$15 = 2x \quad \leftarrow \text{Adding } 4 \text{ to both sides gets the } x \text{ term on its own}$$

$$7.5 = x \quad \leftarrow \text{Dividing both sides by } 2 \text{ gets } x \text{ on its own and finds that } x \text{ is } 7.5$$

$$2(7.5) + 5 = 20 \quad \leftarrow \text{Substituting } 7.5 \text{ for } x \text{ in } 2x + 5 \text{ finds that the base of the triangle } AB \text{ is } 20 \text{ cm}$$

$$20 \div 2 = 10 \quad \leftarrow \text{The height drawn on the triangle is a line of symmetry. So dividing the } 20 \text{ cm by } 2 \text{ works out that the base of the green right-angled triangle is } 10 \text{ cm}$$

$$2(7.5) + 11 \quad \leftarrow \text{Substituting } 7.5 \text{ for } x \text{ in } 2x + 11 \text{ finds that } AC \text{ is } 26 \text{ cm}$$

$$10^2 + h^2 = 26^2 \quad \leftarrow \text{Using Pythagoras' Theorem in the green right-angled triangle to find the height. Let } h \text{ be the height. } a^2 + b^2 = c^2, \text{ where } c \text{ is the longest side. So substituting } 10 \text{ cm for } a, h \text{ for } b \text{ and } 26 \text{ cm for } c$$

$$h^2 = 576 \quad \leftarrow \text{Subtracting } 10^2 \text{ from both sides gets } h^2 \text{ on its own}$$

$$h = 24 \quad \leftarrow \text{Square rooting both sides gets } h \text{ on its own and finds that the height of the triangle is } 24 \text{ cm}$$

$$\frac{1}{2} \times 20 \times 24 \quad \leftarrow \text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\dots\dots\dots 240 \dots\dots\dots \text{ cm}^2$$

(Total for Question 26 is 5 marks)

$$27 \quad 1.25 \times 10^{-12} = k \times (4 \times 10^{-20})$$

Work out the value of k .
Give your answer in standard form.

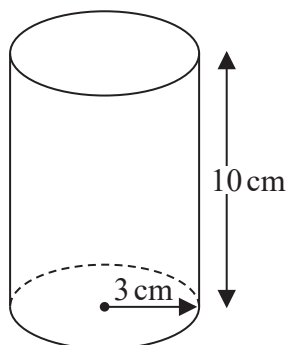
$$\frac{1.25 \times 10^{-12}}{4 \times 10^{-20}} = k \quad \leftarrow \text{Dividing both sides by } 4 \times 10^{-20} \text{ gets } k \text{ on its own}$$

31250000 is converted to standard form

$$k = \dots 3.125 \times 10^7$$

(Total for Question 27 is 2 marks)

28 The diagram shows a solid cylinder with base radius 3 cm and height 10 cm.



The cylinder is made from steel.
It has a mass of 2250 g.

Work out the density of the steel.
Give your answer correct to 3 significant figures.

$$\pi \times 3^2 \times 10$$

Volume of a cylinder is the same formula as the volume of a prism.
Volume of prism = area of cross section \times length. The circle is the cross section as this is the 2D shape that repeats throughout the cylinder.
Area of circle = $\pi \times \text{radius}^2$. Then multiplying this by the length of 10 cm

$$2250 \div 90\pi \quad \leftarrow \text{g/cm}^3 \text{ means to divide the mass in g by the volume in cm}^3$$

7.957... is given to 3 significant figures

$$\dots 7.96 \dots \text{ g/cm}^3$$

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS