

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)

Wednesday 8 November 2023

Morning (Time: 1 hour 30 minutes)

Paper
reference

1MA1/1F

Mathematics
PAPER 1 (Non-Calculator)
Foundation Tier



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, 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 not be used.**

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 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 list of numbers.

2 4 4 7 8

Work out the range of these numbers.

$8 - 2$

Range = largest - smallest. The largest is 8 and the smallest is 2

6

(Total for Question 1 is 1 mark)

2 Work out $120 - 89$

$$\begin{array}{r} 120 \\ - 89 \\ \hline 31 \end{array}$$

31

(Total for Question 2 is 1 mark)

3 Simplify $3 \times a \times 4$

Multiplication can be done in any order. So doing the 3×4 first gives 12. Writing the a next to this means that it is multiplied

12a

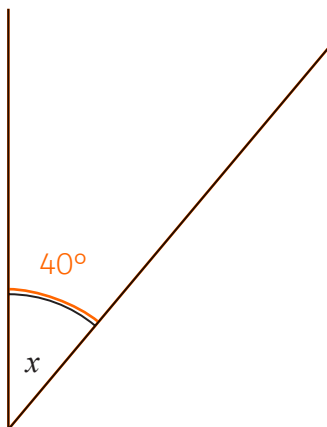
(Total for Question 3 is 1 mark)

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4 Measure the size of the angle marked x .



Measured using a protractor

..... 40 °

(Total for Question 4 is 1 mark)

5 Work out $\frac{1}{5}$ of 300

$$\begin{array}{r} 060 \\ 5 \overline{)300} \end{array}$$

To work out $\frac{1}{5}$ of a number, divide the number by 5

..... 60

(Total for Question 5 is 1 mark)



- 6 There are 3 litres of oil in a can.
Jermaine uses 700 millilitres of the oil.

Work out the amount of oil left in the can.
Give your answer in millilitres.

$$3 \times 1000$$

There are 1000 millilitres in a litre. So multiplying the 3 by 1000 converts it to 3000 millilitres

$$\begin{array}{r} 3000 \\ - 700 \\ \hline 2300 \end{array}$$

Subtracting the 700 millilitres used from the 3000 millilitres starting in the can works out how many millilitres are left

.....2300..... millilitres

(Total for Question 6 is 3 marks)

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7 Matt is drawing a scale diagram.

1 cm represents 5 m.

He draws a line 3 cm long.

(a) What real distance does the line represent?

3×5

Multiplying the 3 cm by the 5 m which each centimetre represents works out that the real distance is 15 m

..... 15 m
(1)

The real distance between two points is 20 m.

(b) What is the distance between the two points on the scale diagram?

$20 \div 5$

Dividing the 20 m by the 5 m represented by each centimetre works out that it is represented by 4 cm

..... 4 cm
(1)

(Total for Question 7 is 2 marks)

8 Miss Bailey asked 24 students where they each wanted to go on a school trip.

Here are the results.

museum	castle	castle	farm
farm	castle	farm	farm
castle	farm	castle	castle
castle	farm	castle	museum
museum	farm	castle	museum
museum	museum	castle	castle

(a) Complete the frequency table.

Place	Tally	Frequency
castle		11
farm		7
museum		6

(2)

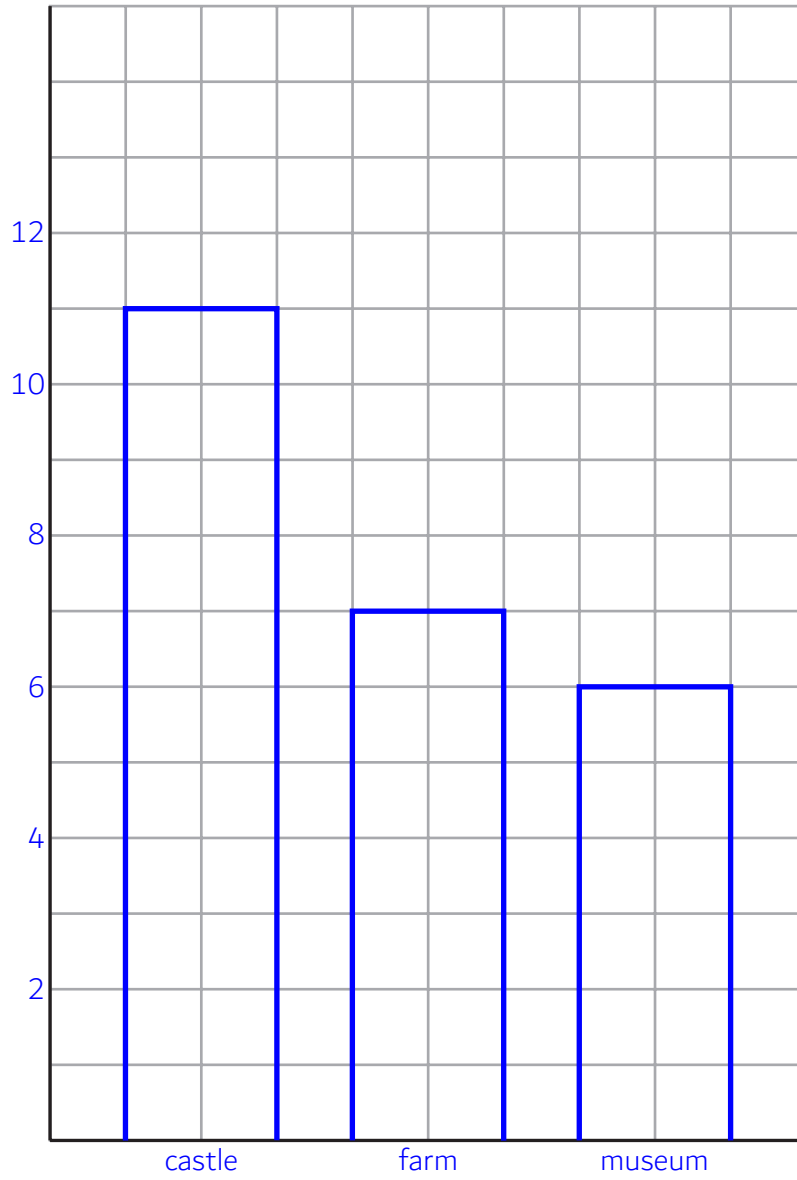
(b) Write down the place that is the mode.

The mode is the place with the highest frequency

castle

(1)

(c) Draw a bar chart to show the results.



(3)

(Total for Question 8 is 6 marks)

9 Selina has a bag of 22 counters.

5 of the counters are blue.

9 of the counters are red.

8 of the counters are pink.

Selina takes at random a counter from the bag.

Write down the probability that Selina

(i) takes a red counter,

9 out of the 22 counters are red

$$\frac{9}{22}$$

(1)

(ii) does **not** take a pink counter,

5+9

Adding the 5 blue and 9 red works out that there are 14 which are not pink. 14 out of the 22 counters are not pink

$$\frac{14}{22}$$

(1)

(iii) takes a white counter.

There are no white counters so this is impossible

$$0$$

(1)

(Total for Question 9 is 3 marks)

10 Here are the ingredients needed to make 20 peanut butter cookies.

<p>Makes 20 cookies</p> <p>250 g peanut butter</p> <p>200 g sugar</p> <p>2 small eggs</p>

Derek wants to make 60 cookies.

He has 900 g of peanut butter.

Does Derek have enough peanut butter to make 60 cookies?

You must show how you get your answer.

$$60 \div 20$$

Dividing the 60 cookies Derek want to make by the 20 cookies in the instructions works out how many lots of 20 cookies are wanted

$$6 \div 2$$

Dividing both the 60 and 20 by 10 simplifies the division and finds that 3 lots of 20 cookies are wanted

$$\begin{array}{r} 250 \\ \times 3 \\ \hline 750 \end{array}$$

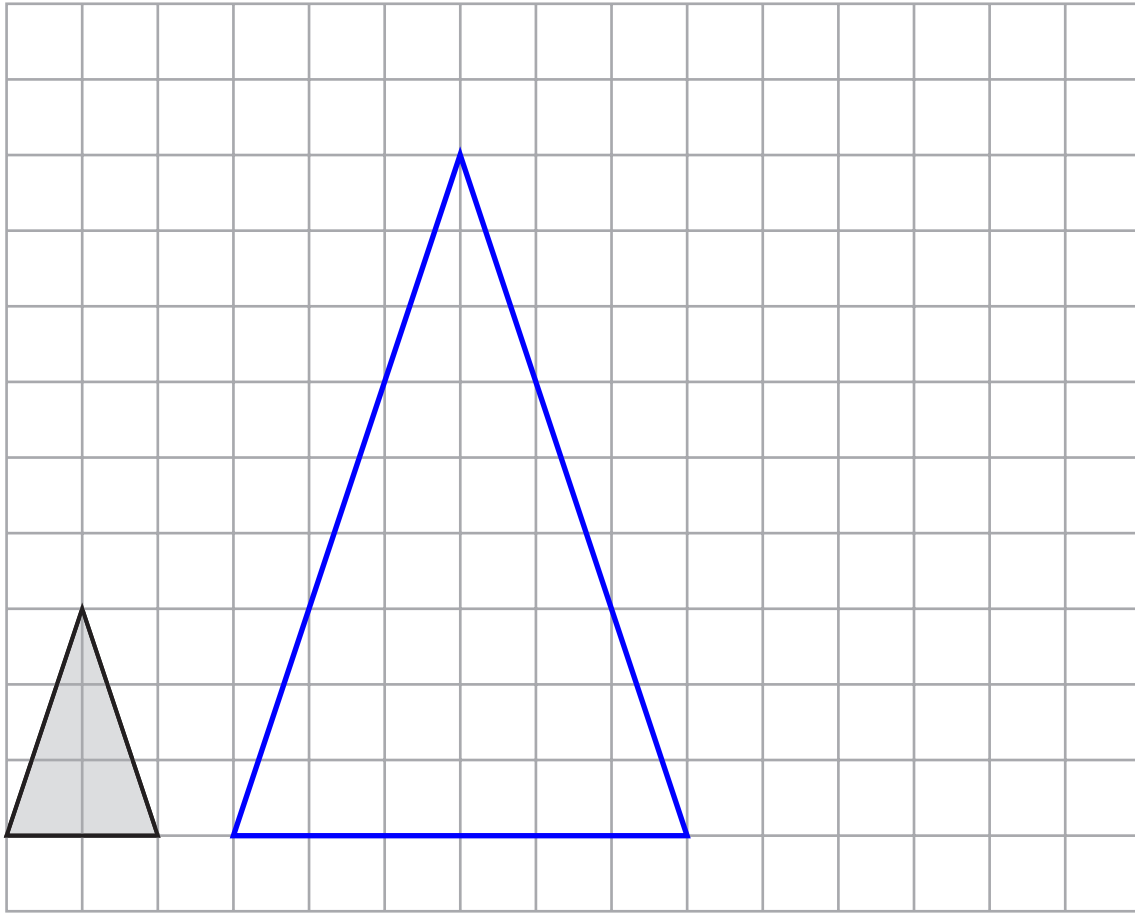
Multiplying the 250 g of peanut butter needed for 20 cookies by 3 works out that 750 g of peanut butter would be needed for 60 cookies

Yes

The 900 g of peanut butter he has is more than the 750 g he needs. So yes he does have enough peanut butter to make 60 cookies

(Total for Question 10 is 3 marks)

11



On the grid, draw an enlargement of the triangle with a scale factor of 3

The base of the original triangle was 2 cm and its height was 3 cm. Multiplying both of these by the scale factor of 3 finds that the new base is 6 cm and the new height is 9 cm

(Total for Question 11 is 2 marks)

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$$12 \quad P = 2g + 4h$$

(a) (i) Work out the value of P when $g = 3$ and $h = 5$

$$2 \times 3 = 6$$

$2g = 2 \times g = 2 \times 3$. So $2g$ is worth 6

$$4 \times 5 = 20$$

$4h = 4 \times h = 4 \times 5$. So $4h$ is worth 20

$$6 + 20$$

Adding the value of $2g$ and the value of $4h$ works out the value of P

$$P = \dots\dots\dots \frac{26}{(2)}$$

(ii) Work out the value of g when $P = 38$ and $h = 3$

$$38 = 2g + 12$$

Substituting the known values into the equation. $4h = 4 \times h = 4 \times 3 = 12$

$$26 = 2g$$

Subtracting 12 from both sides eliminates the 12 on the right and gets the g term on its own

$$2 \overline{) 26} \begin{array}{r} 13 \\ \end{array}$$

Dividing both sides by 2 eliminates the 2 on the right and gets g on its own

$$g = \dots\dots\dots \frac{13}{(2)}$$

$$V = 3r - q$$

(b) Work out the value of V when $r = -3$ and $q = 2$

$$3 \times -3$$

$3r = 3 \times r = 3 \times -3 = -9$

$$-9 - 2$$

Subtracting the value of q from the value of $3r$. Subtracting from a negative makes it more negative

$$V = \dots\dots\dots \frac{-11}{(2)}$$

(Total for Question 12 is 6 marks)

13 Chloe is making scrunchies.

Chloe has a large number of hair bands.
Each hair band costs 8p.

She buys 100 g of wool for £3

Chloe uses 1 hair band and 5 g of wool to make each scrunchy.
She makes as many scrunchies as she can.

Work out the total cost of each scrunchy that she makes.
Give your answer in pence.

$300 \div 100$

£1 = 100p, so £3 = 300p. Dividing the 300p by the 100 g works out that 1 g of wool costs 3p

3×5

Multiplying the cost of 1 g of wool by the 5 g used in each scrunchy works out that it costs 15p for the wool in each scrunchy

$15 + 8$

Adding the cost of a hairband to the cost of the wool works out that the cost of each scrunchy is 23p

23

p

(Total for Question 13 is 4 marks)

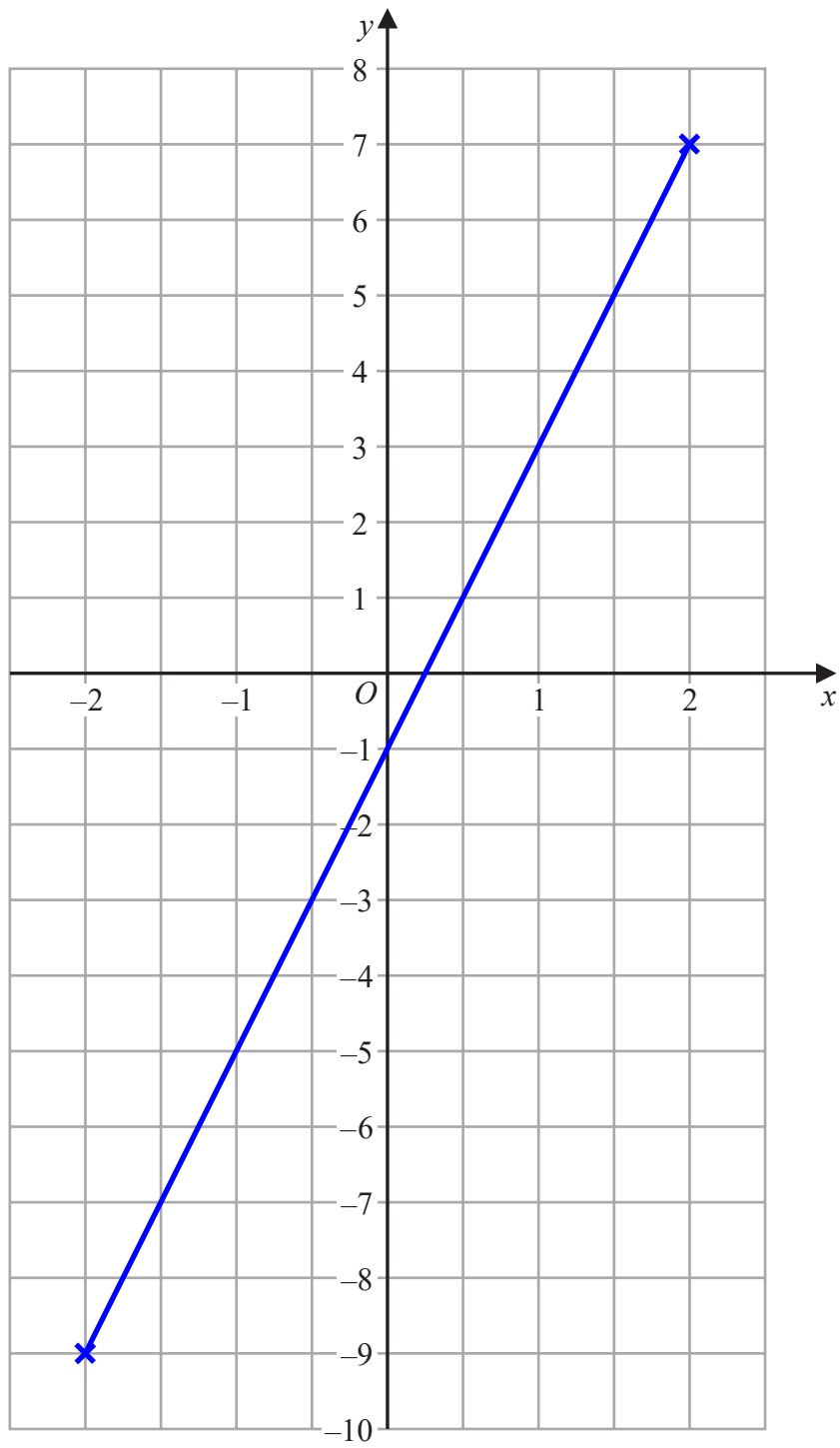
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14 On the grid, draw the graph of $y = 4x - 1$ for values of x from -2 to 2

When $x = -2$, $y = 4(-2) - 1 = -8 - 1 = -9$. So plotting the point $(-2, -9)$.
When $x = 2$, $y = 4(2) - 1 = 8 - 1 = 7$. So plotting the point $(2, 7)$. It is a straight line so connecting these two points completes the graph



(Total for Question 14 is 3 marks)



- 15 Steve is buying a car.
The car costs £12 000

Steve pays 25% of the cost as a deposit.
He pays the rest of the cost in 20 equal monthly payments.

How much is each monthly payment?

$$\begin{array}{r} 03000 \\ 4 \overline{)12000} \end{array}$$

25% is equivalent to $\frac{1}{4}$. Dividing the £12000 by 4 works out $\frac{1}{4}$ of the cost and so works out that the deposit is £3000

$$\begin{array}{r} \pounds 12000 \\ - 3000 \\ \hline 9000 \end{array}$$

Subtracting the deposit from the cost of the car works out that the total of the monthly payments is £9000

$$\begin{array}{r} 0450 \\ 20 \overline{)9000} \end{array}$$

Dividing the total of the monthly payments by the 20 months works out that each monthly payment is £450

£ 450

(Total for Question 15 is 4 marks)

- 16 Shah takes an exam.
The exam is out of 60 marks.

Shah needs to score at least 70% of the marks to pass the exam.
He scores 45 marks.

Show that Shah passes the exam.

$$6 \times 7 = 42$$

10% is equivalent to $\frac{1}{10}$. So to find 10% of the marks the 60 can be divided by 10 to get 6. Multiplying the value of 10% by 7 works out that 70% of the marks is 42. So Shah needs to score at least 42 marks to pass the exam. 45 is more than this so Shah passes the exam

(Total for Question 16 is 2 marks)

17 Work out $\frac{3}{5} \div \frac{1}{6}$

Give your answer as a mixed number.

$$\frac{3}{5} \times \frac{6}{1}$$

To divide by a fraction: keep the first part, change the sign to multiplication and flip the second fraction

$$\frac{18}{5}$$

To multiply fractions: multiply the numerators and multiply the denominators

To convert a fraction to a mixed number: divide the numerator by the denominator to get the whole number and leave the remainder in the fraction

$$3\frac{3}{5}$$

(Total for Question 17 is 3 marks)

18 Work out 6.3×2.4

$$\begin{array}{r} 63 \\ \times 24 \\ \hline 252 \\ 1260 \\ \hline 1512 \end{array}$$

Ignoring the decimals and multiplying 63 and 24

There were 2 decimal places in total in 6.3 and 2.4 so moving the decimal point 2 times to the left

$$15.12$$

(Total for Question 18 is 3 marks)

19 (a) (i) Write down the value of 5^0

Anything to the power of 0 is 1

$\frac{1}{\dots\dots\dots}$
(1)

(ii) Write down the value of 5^{-2}

$5^2 = 5 \times 5 = 25$ then the negative power means to do the reciprocal (do 1 over)

$\frac{1}{25}$
(1)

(b) Write $\frac{2^5 \times 2^4}{2^3}$ in the form 2^n where n is an integer.

$\frac{2^9}{2^3}$ ← $a^x \times a^y = a^{x+y}$, so $2^5 \times 2^4 = 2^{5+4} = 2^9$

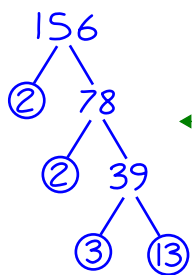
$a^x/a^y = a^{x-y}$, so $2^9/2^3 = 2^{9-3} = 2^6$

2^6
(2)

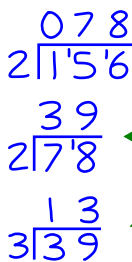
(Total for Question 19 is 4 marks)

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20 (a) Write 156 as a product of its prime factors.



Doing a factor tree for 156 by splitting each number into factors and circling the primes



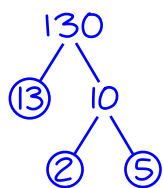
Some divisions to help do the factor tree

The circled primes are the prime factors. Writing these multiplied together

$2^2 \times 3 \times 13$

(2)

(b) Find the highest common factor (HCF) of 156 and 130



Doing a factor tree for 130 by splitting each number into factors and circling the primes

$2 \times 5 \times 13$

The circled primes are the prime factors. Writing these multiplied together. This expresses 130 as a product of its prime factors

2×13

The highest common factor is the lowest power of each prime in both of the products of prime factors multiplied together. Where there is none of a prime, this is the lowest power

26

(2)

(Total for Question 20 is 4 marks)

21 The mean length of 5 sticks is 4.2 cm.

Nawal measured the length of one of the sticks as 7 cm.

(a) Work out the mean length of the other 4 sticks.

m^t_n ←

Mean = total/number, where total is the total length of all the sticks and number is the number of sticks. Writing this as a formula triangle

$$\begin{array}{r} 42 \\ \times 5 \\ \hline 210 \end{array}$$

From the formula triangle, total = mean x number. So multiplying the mean of 4.2 cm by the 5 sticks works out that the total length of the 5 sticks is 21 cm. Ignoring the decimal then putting it back in after

21-7 ←

Subtracting the 7 cm stick from the total of 21 cm works out that the total of the other 4 sticks is 14 cm

$$\begin{array}{r} 03.5 \\ 4 \overline{)14.0} \end{array}$$

From the formula triangle, mean = total/number. So dividing the total length of the other 4 sticks by 4 works out the mean length of the other 4 sticks

..... 3.5 cm
(3)

Nawal made a mistake.

The stick was not 7 cm long.

It was 17 cm long.

(b) How does this affect your answer to part (a)?

It will be less

As the total of the other 4 sticks will be less. Dividing this total by 4 to work out the mean will give a lower mean

(1)

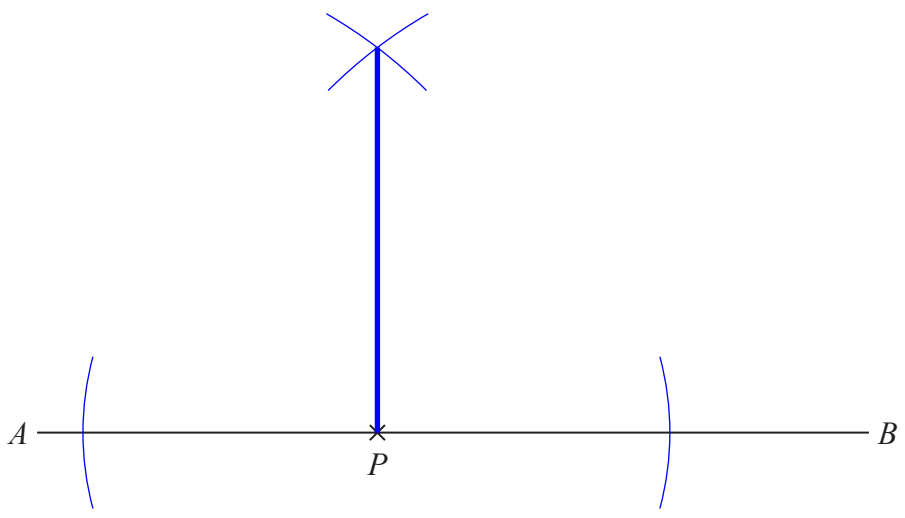
(Total for Question 21 is 4 marks)

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22 The point P lies on the line AB .
Use ruler and compasses to construct an angle of 90° at P .
You must show all your construction lines.

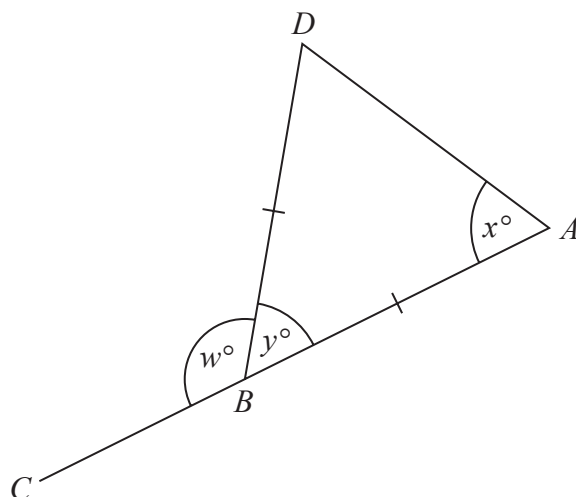


Scribing two arcs from point P using the same radius. Then scribing an arc from each of these arcs to form a cross. Drawing from P to this cross constructs an angle of 90° at P . This is basically doing an angle bisector of angle APB

(Total for Question 22 is 2 marks)



23 The diagram shows an isosceles triangle ABD and the straight line ABC .



$$BA = BD$$

$$x : y = 2 : 1$$

Work out the value of w .

$$y + 2y + 2y$$

From the ratio, x is double y , so $x = 2y$. Angle BDA is also x as the base angles of an isosceles triangle are equal. Adding all the angles together in the triangle ABD and substituting x for $2y$

$$5y = 180$$

Simplifying the expression of the total of the angles in triangle ABD by collecting the like terms. Setting this equal to 180 as there are 180° in a triangle

$$5 \overline{) 180}$$

Dividing both sides by 5 finds that $y = 36$

$$\begin{array}{r} 180 \\ - 36 \\ \hline 144 \end{array}$$

Angles around a point on a straight line add up to 180° . So subtracting angle y from 180 leaves angle w

$$w = \dots\dots\dots 144$$

(Total for Question 23 is 4 marks)

24 Mano has three shelves of books.

There are x books on shelf **A**.

There are $(3x + 1)$ books on shelf **B**.

There are $(2x - 5)$ books on shelf **C**.

There is a total of 44 books on the three shelves.

All the books have the same mass.

The books on shelf **B** have a total mass of 7500 g.

Work out the total mass of the books on shelf **A**.

$$6x - 4 = 44$$

Adding the expressions of the number of books on each shelf gives $x + 3x + 1 + 2x - 5$, which simplifies to $6x - 4$, which must be equal to the 44 books as this is the total of the books on the three shelves

$$6x = 48$$

Adding 4 to both sides eliminates the -4 on the left and gets the x term on its own

$$x = 8$$

Dividing both sides by 6 eliminates the 6 on the left and gets x on its own

$$3 \times 8$$

Multiplying the value of x by 3 works out that $3x$ is 24

$$24 + 1$$

Adding 1 works out that the value of $3x + 1$ is 25, so there are 25 books on shelf **B**

$$\begin{array}{r} 0300 \\ 25 \overline{)7500} \end{array}$$

Dividing the mass of the books on shelf **B** by the 25 books works out that each book has a mass of 300 g

$$\begin{array}{r} 300 \\ \times 8 \\ \hline 2400 \end{array}$$

There are 8 books on shelf **A** as this is the value of x . Multiplying the mass of each book by the 8 books works out that the total mass of the books on shelf **A** is 2400 g

..... 2400 g

(Total for Question 24 is 5 marks)

25 A piece of glass has a mass of 27 g and a volume of 10 cm^3

Work out the density of the piece of glass.

$$27 \div 10$$

The unit of g/cm^3 means to divide the mass in g by the volume in cm^3

Moving the decimal point once to the left divides by 10

$$\dots\dots\dots 2.7 \dots\dots\dots \text{g/cm}^3$$

(Total for Question 25 is 2 marks)

26 Work out an estimate for $\frac{5.7 \times 8.2}{0.26}$

$$6 \times 8$$

Rounding all the values to 1 significant figure. 5.7 becomes 6 and 8.2 becomes 8

$$\frac{48}{0.3}$$

0.26 rounded to 1 significant figure is 0.3

$$\begin{array}{r} 160 \\ 3 \overline{)480} \end{array}$$

Multiplying both the numerator and denominator by 10 eliminates the decimal and gives $480/3$, which is an equivalent fraction

$$\dots\dots\dots 160 \dots\dots\dots$$

(Total for Question 26 is 3 marks)

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

$$6x^2 - 15x + 4x - 10$$

$$\frac{6x^2 - 11x - 10}{(2)}$$

(b) Factorise $x^2 - 16$

Two square numbers subtracted can be factorised using difference of two squares: $A^2 - B^2 = (A + B)(A - B)$. $A^2 = x^2$, so $A = x$. $B^2 = 16$, so $B = 4$

$$\frac{(x+4)(x-4)}{(1)}$$

(Total for Question 27 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

