

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)

Monday 13 November 2023

Morning (Time: 1 hour 30 minutes)

Paper
reference

1MA1/3F

Mathematics
PAPER 3 (Calculator)
Foundation 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.

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 Write 35% as a decimal.

To convert a percentage to a decimal it can be divided by 100. $35 \div 100 = 0.35$

0.35

(Total for Question 1 is 1 mark)

2 Write 8061 correct to the nearest hundred.

The 0 is in the hundreds place. The 6 after it causes the 0 to be rounded up to a 1 then everything after it is set to 0

8100

(Total for Question 2 is 1 mark)

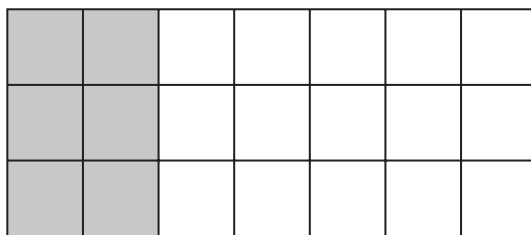
3 Write down a number that is less than -5

-6 is 1 less than -5

-6

(Total for Question 3 is 1 mark)

4 Here is a grid of squares.



What fraction of the grid is shaded?

6 out of the 21 squares are shaded

$\frac{6}{21}$

(Total for Question 4 is 1 mark)

5 Write down the value of the 9 in the number 27.963

0.9

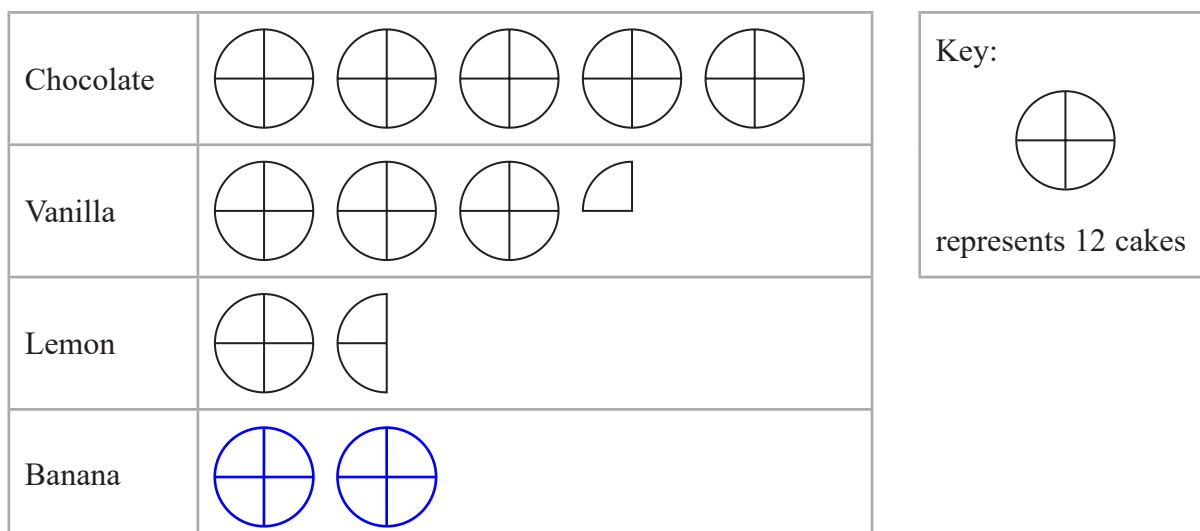
(Total for Question 5 is 1 mark)

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- 6 The pictogram shows information about the number of chocolate cakes, vanilla cakes and lemon cakes sold by Year 7 at a school fair.



24 banana cakes were sold by Year 7

- (a) Use this information to complete the pictogram.

Each symbol represents 12 cakes and 24 is 2 lots of 12 so 2 symbols need to be drawn for banana

(1)

At the fair, Year 8 sold a total of 150 cakes.

- (b) Which Year sold most cakes at the fair, Year 7 or Year 8?
You must show how you get your answer.

$$11\frac{3}{4} \times 12 = 141$$

There are $11\frac{3}{4}$ symbols in total in the pictogram. Multiplying this by the 12 each symbol represents works out that Year 7 sold a total of 141 cakes

Year 8

150 cakes is more than 141 cakes so Year 8 sold more

(3)

(Total for Question 6 is 4 marks)

- 7 Miklos is swimming lengths of a swimming pool.
Each length of the pool is 25 m.

Miklos has swum 178 lengths of the pool.
He wants to swim a total distance of 8050 m.

Calculate how many more lengths Miklos needs to swim.

178×25

Multiplying the 178 lengths by the 25 m works out that Miklos has swum 4450 m so far

$8050 - 4450$

Subtracting the 4450 m he has swum from the 8050 m he wants to swim works out that he has to do another 3600 m

$3600 \div 25$

Dividing the 3600 m by the 25 m works out that he needs to swim another 144 lengths

144

(Total for Question 7 is 3 marks)

- 8 Here are the first four terms of a number sequence.

97

91

85

79

- (a) Explain how to work out the next number of the sequence.

Subtract 6

The sequence is going down in 6s

(1)

- (b) Work out the difference between the 5th term and the 7th term of the sequence.

6×2

It is going down in 6s and the 7th term is 2 terms after the 5th term. So 6×2 works out how much less the 7th term is than the 5th term and so works out the difference between the two terms

12

(2)

- (c) Explain why 52 is **not** a number in this sequence.

It is even

All of the terms in the sequence will be odd as subtracting an even from an odd number gives an odd number

(1)

(Total for Question 8 is 4 marks)

9 Mandy buys a 12 kilogram bag of dog food.

Mandy's dog has 3 meals a day.

She gives her dog 105 grams of dog food for each of these meals.

How many complete weeks will the bag of dog food last?

You must show all your working.

$$105 \times 3$$

Multiplying the 105 grams for each meal by the 3 meals the dog has each day works out that the dog eats 315 grams each day

$$315 \times 7$$

There are 7 days in a week. Multiplying the 315 grams the dog eats each day by 7 works out that the dog eats 2205 grams each week

$$\frac{12 \times 1000}{2205}$$

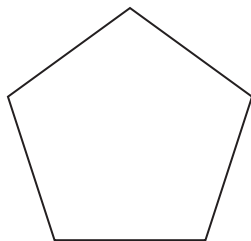
There are 1000 grams in a kilogram so multiplying the 12 kilograms in the bag by 1000 converts it into grams. Dividing this by the 2205 grams the dog eats each week works out how many weeks the bag of dog food will last

5.44... is rounded down to 5 as the question is asking for complete weeks and 6 is too many

5

(Total for Question 9 is 5 marks)

10 Here is a polygon.



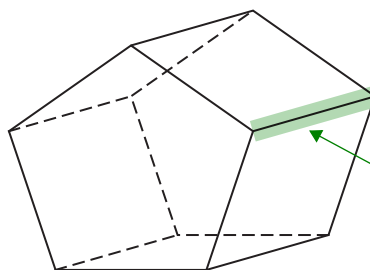
(a) Write down the mathematical name of this polygon.

Pentagons have 5 straight sides

Pentagon

(1)

Here is a prism.



This is an edge

Each edge of the prism has a length of 7.5 cm.

(b) Work out the total length of the edges of the prism.

7.5×15

The prism has 15 edges. Multiplying the 7.5 cm by the 15 edges works out the total length of the edges of the prism

112.5

cm

(2)

(Total for Question 10 is 3 marks)

11 There are only red counters, blue counters and green counters in a bag.

number of red counters : number of blue counters : number of green counters = 2 : 16 : 7

What fraction of the counters in the bag are green counters?

$2+16+7$

Adding the 2, 16 and 7 parts in the ratio works out that there are 25 parts in total in the ratio

7 out of the 25 parts are for green

$\frac{7}{25}$

(Total for Question 11 is 2 marks)

12 A chess match lasted $3\frac{1}{4}$ hours.

The match finished at 14 10

At what time did the chess match start?

Entering $14^{\circ}10' - 3\frac{1}{4}^{\circ}$ into the calculator using the 'time button' gives $10^{\circ}55'0''$

10 55

(Total for Question 12 is 2 marks)

13 (a) Simplify $8h^3 + 14h^3 - 2h^3$

Collecting like terms. They are all h^3 terms and $8 + 14 - 2 = 20$

$20h^3$

(1)

(b) Simplify $(9y + 12y) \div 3$

$21y \div 3$ ← Doing the brackets first. $9y + 12y = 21y$

$21y \div 3 = 7y$

$7y$

(1)

(Total for Question 13 is 2 marks)

14 Write the following numbers in order of size.

Start with the smallest number.

$\frac{7}{12}$	0.56	57%	$\frac{6}{11}$	0.558
$58.\dot{3}$	56		$54.\dot{5}\dot{4}$	55.8

Converting the fractions and decimals into percentages by multiplying them by 100 makes them easier to compare to each other

$\frac{6}{11}$ 0.558 0.56 57% $\frac{7}{12}$

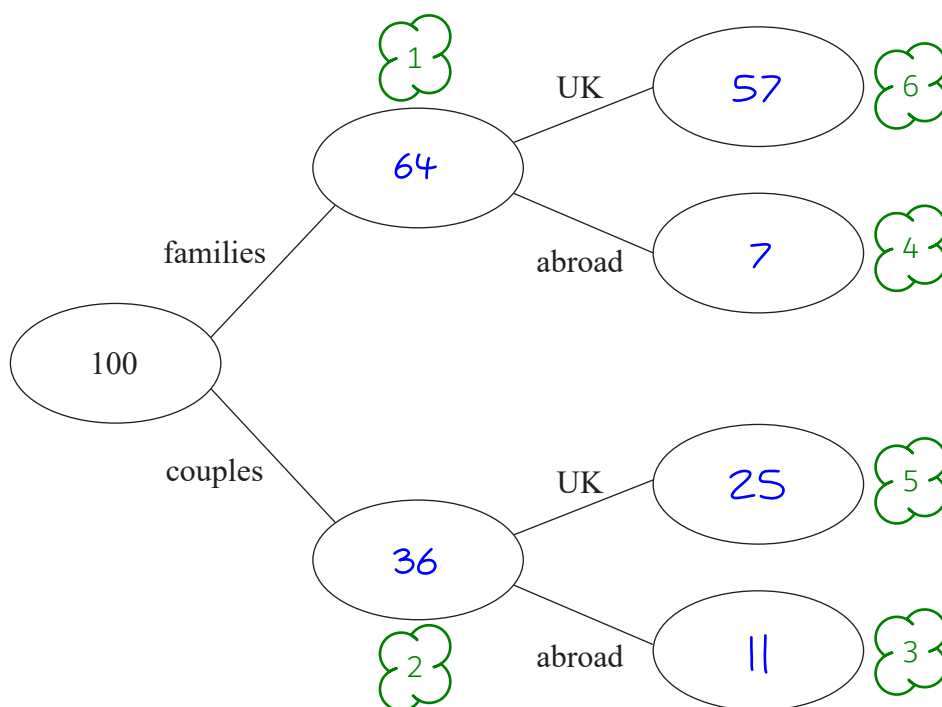
(Total for Question 14 is 2 marks)

- 15 A travel agent sold 100 holidays in April.
Each of these holidays was in the UK or was abroad.

64 of the 100 holidays were sold to families.
The rest of the holidays were sold to couples.

11 of the 18 holidays abroad were sold to couples.

- (a) Use this information to complete the frequency tree.



Explanations are on the next page

(3)

One of the holidays sold to a family is chosen at random.

- (b) Find the probability that this holiday was **not** abroad.

57 out of the 64 holidays sold to families are not abroad

$$\frac{57}{64}$$

(2)

(Total for Question 15 is 5 marks)

- 1) 64 of the 100 holidays were sold to families
- 2) The rest of the holidays were sold to couples. $100 - 64 = 36$
- 3) 11 of the 18 holidays abroad were sold to couples
- 4) The rest of the 18 holidays abroad must have been for families. $18 - 11 = 7$
- 5) $36 - 11 = 25$
- 6) $64 - 7 = 57$

16 Solve $\frac{x}{7} + 9 = 4$

$$\frac{x}{7} = -5$$

Subtracting 9 from both sides eliminates the +9 on the left and gets the term involving x on its own

Multiplying both sides by 7 eliminates the 7 as the denominator on the left and gets x on its own

$$x = \dots\dots\dots -35$$

(Total for Question 16 is 2 marks)

17 Blake works 32 hours a week in the UK.
She is paid £473.28 per week.

Blake applies for a job in Australia.
The rate of pay is 26.40 Australian dollars per hour.

£1 = 1.796 Australian dollars

Blake thinks the rate of pay in Australia is greater than the rate of pay in the UK.

Is Blake correct?
You must show how you get your answer.

$$473.28 \div 32$$

Dividing the £473.28 paid per week by the 32 hours worked each week works out that her rate of pay is £14.79 per hour

$$14.79 \times 1.796$$

Multiplying the rate of pay in £ by 1.796 converts it into Australian dollars

$$26.56$$

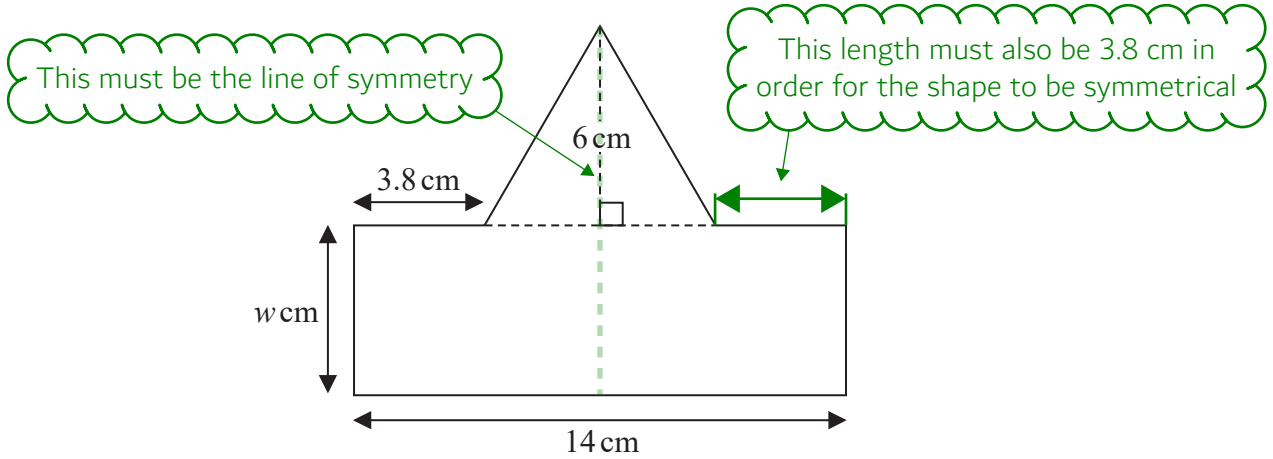
Giving the rate of pay in Australian dollars to the nearest cent

No

Her current rate of pay in the UK is equivalent to about 26.56 Australian dollars. The 26.40 is not more than this

(Total for Question 17 is 3 marks)

18 Here is a shape made from a rectangle and a triangle.



The shape has exactly one line of symmetry.

The area of the rectangle is 3.5 times the area of the triangle.
The width of the rectangle is w cm.

Work out the value of w .
You must show all your working.

$14 - 3.8 - 3.8$ ← Subtracting both of the 3.8 cm lengths from the 14 cm works out that the base of the triangle is 6.4 cm

$\frac{1}{2} \times 6.4 \times 6$ ← Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$. The base is 6.4 cm and the height is 6 cm

19.2×3.5 ← The area of the triangle is 19.2 cm². Multiplying this by 3.5 works out that the area of the rectangle is 67.2 cm²

$67.2 \div 14$ ← Area of rectangle = length \times width. So width = area \div length

$w = \dots\dots\dots 4.8$

(Total for Question 18 is 5 marks)

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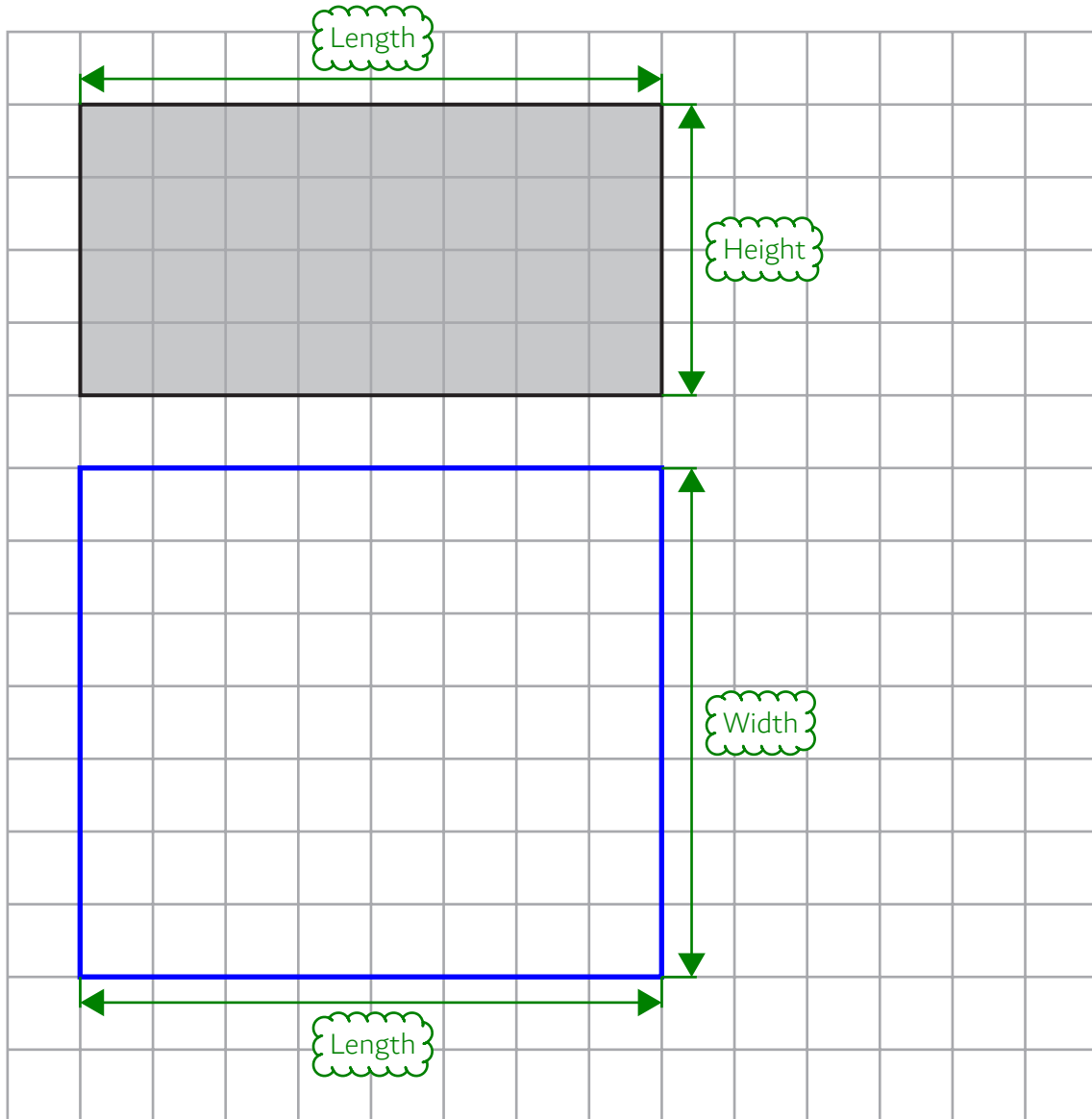


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19 The front elevation of a cuboid is shown on the centimetre grid below.



The volume of the cuboid is 224 cm^3

On the grid, draw the plan of the cuboid.

$$8 \times w \times 4 = 224$$

Volume of cuboid = length x width x height. The length is 8 cm, the height is 4 cm and let w be the width. Multiplying these must give the actual volume of 224 cm^3

$$w = \frac{224}{8 \times 4}$$

Dividing both sides by the 8 and 4 gets w on its own

$$= 7$$

So the width must be 7 cm

The plan is the view from above. The length and width will be visible but not the height

(Total for Question 19 is 3 marks)

20 (a) Write $468\,000$ in standard form.

468000 needs to be divided by 10 5 times to get 4.68 (which is a decimal at least 1 and less than 10). So 4.68 needs to be multiplied by 10^5 to keep it equal

$$4.68 \times 10^5$$

(1)

(b) Write 5.037×10^{-4} as an ordinary number.

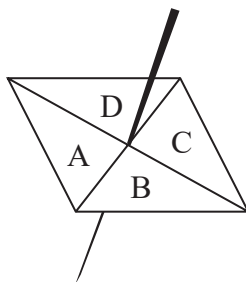
$\times 10^{-4}$ means to divide by 10 4 times. Moving the decimal point 4 times to the left does this

$$0.0005037$$

(1)

(Total for Question 20 is 2 marks)

21 Here is a biased spinner.



The table shows the probabilities that when the spinner is spun it will land on A, on B, on C and on D.

Letter	A	B	C	D
Probability	0.4	0.21	0.32	0.07

Luka will spin the spinner 200 times.

Work out an estimate for the number of times the spinner will land on A.

$$0.4 \times 200$$

Multiplying the probability of A by the number of times it is spun works out an estimate of the number of times it will land on A

$$80$$

(Total for Question 21 is 2 marks)

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22 Seija works at a weather station.

The table gives information about the temperature, T °C, at midday for each of 50 cities in the UK on Tuesday.

Temperature (T °C)	Frequency	
$10 < T \leq 15$	2	$\times 12.5 = 25$
$15 < T \leq 20$	8	$\times 17.5 = 140$
$20 < T \leq 25$	13	$\times 22.5 = 292.5$
$25 < T \leq 30$	21	$\times 27.5 = 577.5$
$30 < T \leq 35$	6	$\times 32.5 = 195$
		<u>1230</u> $\div 50$

(a) Calculate an estimate for the mean temperature.

First working out the midpoints of each interval as this is the best estimate of the temperature for each. The range of each interval is 5. Half of 5 is 2.5 so adding 2.5 onto the lower bound of each interval works out the midpoints. Then multiplying the frequencies by the midpoint for each interval works out an estimated total for each. Adding all these totals gives an estimated total for all the cities. Mean = total \div number, where total is the total temperature of all the cities and number is the number of cities. So dividing the estimated total by the 50 cities works out an estimate of the mean

..... 24.6 °C
(3)

Seija says,

“The median temperature is 22.5 °C because 22.5 is the middle number in the middle group.”

(b) Is Seija correct?

Give a reason for your answer.

No, the frequencies were ignored

The median is actually in the $25 < T \leq 30$ interval as the 25th and 26th cities when put in order are in this interval

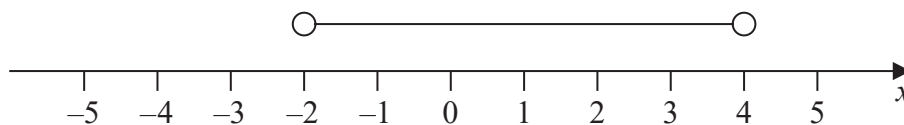
(1)

(Total for Question 22 is 4 marks)



23 Jenna is asked to show the inequality $-3 < x \leq 4$ on a number line.

Here is her answer.



(a) Write down two mistakes Jenna has made.

1 It should be a shaded circle at 4

As it can be equal to 4

2 The left circle should be at -3

As $-3 < x$

(2)

(b) Work out the greatest integer that satisfies the inequality

$$5y - 7 < 16$$

$$5y < 23$$

Adding 7 to both sides eliminates the -7 on the left and gets the y term on its own

$$y < 4.6$$

Dividing both sides by 5 eliminates the 5 on the left and gets y on its own

4 is the greatest integer which is less than 4.6

4

(2)

(Total for Question 23 is 4 marks)

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24 Ali buys packs of balloons and boxes of pencils.

There are 30 balloons in each pack.

There are 24 pencils in each box.

Ali buys exactly the same number of balloons and pencils.

Work out how many packs of balloons and how many boxes of pencils she could have bought.

You must show all your working.

$30 \times 24 = 24 \times 30$

This shows that buying 24 packs of 30 balloons gives the same number as 30 packs of 24 pencils

..... 24 packs of balloons

..... 30 boxes of pencils

(Total for Question 24 is 3 marks)

25 A company orders a large number of plates from a factory.

It would take 30 hours to make all the plates using 4 machines.

How many machines are needed to make all the plates in 6 hours?

30×4

Multiplying the 30 hours by the 4 machines works out that 120 hours worth of work needs to be done

$120 \div 6$

Dividing the 120 hours worth of work by the 6 hours each machine will be working gives the number of machines needed

..... 20

(Total for Question 25 is 2 marks)



26 Riley travelled by car and by aeroplane.

He travelled 143 miles by car at an average speed of 55 miles per hour.
Riley then travelled for 5 hours and 20 minutes by aeroplane.

Work out, in hours and minutes, Riley's total travelling time.

s^d_t

Writing the distance, speed, time formula triangle

$143 \div 55$

From the formula triangle: time = distance \div speed. This works out that the time travelled in the car is 2.6 hours. The unit is hours as this was the unit of time involved in the speed

$2.6 + 5^{\circ}20'$

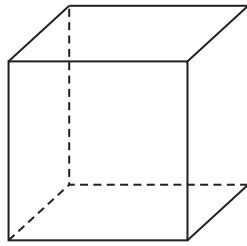
Adding the time travelled by aeroplane to the time travelled by car works out the total travelling time. The times are put into the calculator as sexagesimals

The calculator gives $7^{\circ}56'0''$, which can be read as 7 hours and 56 minutes

..... 7 hours 56 minutes

(Total for Question 26 is 3 marks)

27 The diagram shows a solid cube placed on a horizontal table.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The pressure on the table due to the cube is 3.5 newtons/cm^2
The force exerted by the cube on the table is 504 newtons.

Show that the total surface area of the cube is less than 900 cm^2

$$3.5 = \frac{504}{A}$$

Substituting the pressure and force into the formula.
Let A be the area of the face in contact with the table

$$3.5A = 504$$

Multiplying both sides by A eliminates it as the denominator

$$A = 144$$

Dividing both sides by 3.5 finds that A is 144 cm^2

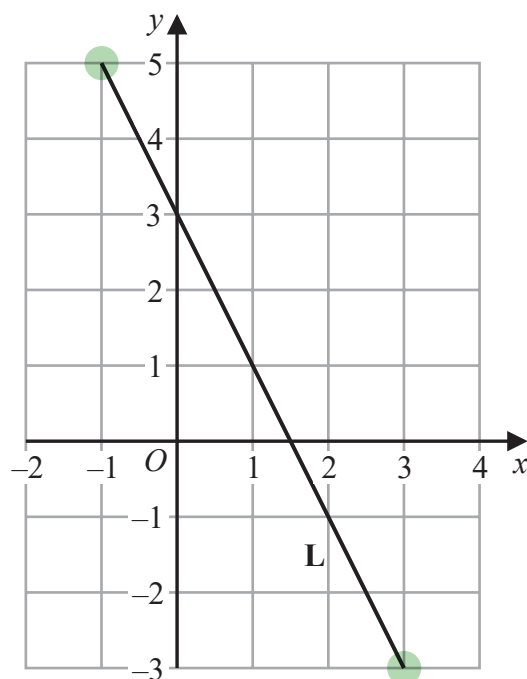
$$144 \times 6 = 864$$

The cube has 6 identical square faces. Multiplying the area of the face in contact with the table by 6 gives the total area of all 6 faces, which is the surface area

The surface area of 864 cm^2 is less than 900 cm^2

(Total for Question 27 is 3 marks)

28 The line **L** is shown on the grid.



Find an equation for **L**.

$$\frac{-3-5}{3--1}$$

Gradient = (change in y)/(change in x). Picking the two end points of the line as these are both on grid lines. y changes from 5 to -3, so $-3 - 5$ expresses the change in y. x changes from -1 to 3, so $3 - -1$ expresses the change in x

The general equation of a straight line is $y = mx + c$, where m is the gradient and c is the y-intercept. The gradient is -2 and the y-intercept is 3 as this is the y-coordinate where the line crosses the y-axis

$$y = -2x + 3$$

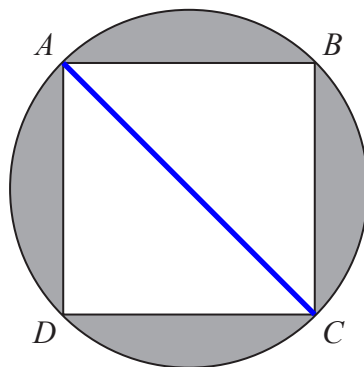
(Total for Question 28 is 3 marks)

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29 A, B, C and D are points on a circle such that $ABCD$ is a square.



The square $ABCD$ has sides of length 3.5 cm.

Calculate the circumference of the circle.
Give your answer correct to 1 decimal place.
You must show all your working.

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

Drawing a line from A to C forms the right-angled triangle ACD . Pythagoras' Theorem (where a and b are the shorter sides and c is the longest side) can be used to work out the missing side

$AC = \sqrt{3.5^2 + 3.5^2}$

Substituting side AC as c , side AD as a and side DC as b . Square rooting both sides of the equation finds side AC

$\pi \times 4.9...$

AC is the diameter. Circumference = $\pi \times$ diameter. Using the exact value of AC by using the Ans button on the calculator

Rounding 15.55... to 1 decimal place

..... 15.6 cm

(Total for Question 29 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

