

.CG Maths.

Worked Solutions



GCSE

C300U20-1



S24-C300U20-1



MONDAY, 3 JUNE 2024 – MORNING

MATHEMATICS – Component 2

Calculator-Allowed Mathematics

FOUNDATION TIER

2 hours 15 minutes

ADDITIONAL MATERIALS

An additional formulae sheet.

A calculator will be required for this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3.142 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the need for good English and orderly, clear presentation in your answers.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	5	
2.	2	
3.	4	
4.	7	
5.	10	
6.	3	
7.	6	
8.	13	
9.	4	
10.	6	
11.	5	
12.	8	
13.	4	
14.	4	
15.	4	
16.	5	
17.	5	
18.	5	
19.	4	
20.	5	
21.	4	
22.	5	
23.	2	
Total	120	

C300U201
01



JUN24C300U20101

Please note that these worked solutions have neither been provided nor approved by Eduqas 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

Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

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

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

Kinematics formulae

Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$



Answer **all** questions.

1. A shop sells bracelets.
Words can be engraved on the bracelet and charms can be added.
The price list is shown below.

**Price List**

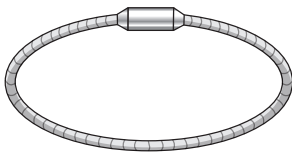
Flower charm
£18



Heart charm
£13.20



Star charm
£37.54



Bracelet
£45

A B C D E Engraving
84p for each letter

- (a) Rhian buys a bracelet with a five-letter word engraved on it.
She also buys a heart charm.
What is the total cost of these items?

[2]

$$0.84 \times 5$$

84p is £0.84. Multiplying the cost of each letter by 5 finds that the cost of the five-letter word is £4.20

$$45 + 4.20 + 13.20$$

Adding the cost of the bracelet, the five-letter word and the heart charm

£62.40

- (b) Huw spent £187.70 on star charms.
How many star charms did he buy?

[1]

$$187.70 \div 37.54$$

Dividing the £187.70 by the £37.54 cost of each star charm finds that 5 star charms were bought

5

- (c) Caitlyn has a special offer voucher.

Voucher

One bracelet and four
flower charms for £95

Caitlyn bought one bracelet and four flower charms using the voucher.
How much cheaper is it to buy these items using the voucher than paying the usual price?

[2]

$$18 \times 4$$

Multiplying the cost of a flower charm by 4 finds that the cost of four flower charms would normally be £72

$$45 + 72$$

Adding the cost of one bracelet and four flower charms finds that the usual price is £117

$$117 - 95$$

Subtracting the £95 using the voucher from the £117 usual price finds that the difference is £22

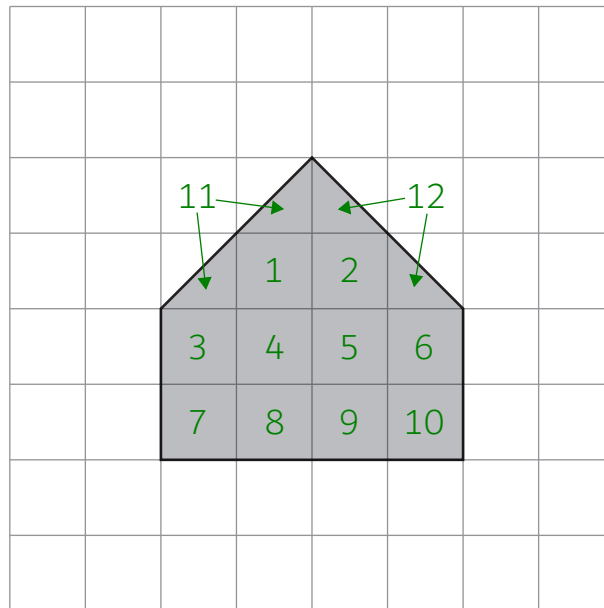
£22



03

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2. A shape is drawn on the 1 cm square grid below.



- (a) What is the area of the shape?

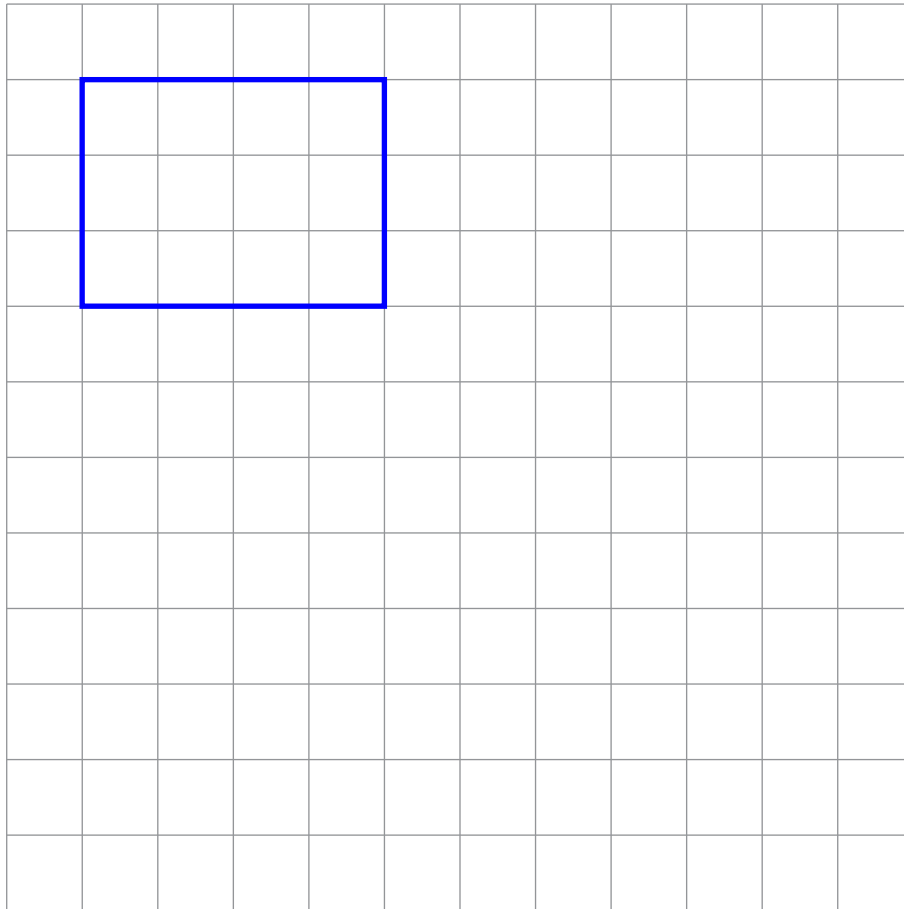
[1]

The squares inside the shape can be counted. Two halves make a whole square

The area of the shape is12..... cm^2



- (b) On the 1 cm square grid below, draw a **rectangle** with the same area as the shape on page 4. [1]



Area of rectangle = length $\times$ width. The area needs to be 12 cm^2 so the length could be 4 cm and the width could be 3 cm as $4 \times 3 = 12$



3.

15	20	31	91	169	200
----	----	----	----	-----	-----

From the numbers in the list above, write down:

(a) a multiple of 7

[1]

91

Multiples of 7 are divisible by 7. Using a calculator to divide each number by 7. $91 \div 7 = 13$, so 91 is a multiple of 7 (it is 7×13)

(b) a factor of 100

[1]

20

A factor of 100 is a number which 100 is divisible by. $100 \div 20 = 5$

(c) a prime number

[1]

31

Prime numbers are only divisible by themselves and 1. A calculator can be used to check if each number is prime by expressing them as a product of prime factors. $15 = 3 \times 5$ so is not prime. 31 comes back as itself so is prime

(d) a square number

[1]

169

Square numbers are the result of multiplying a whole number greater than 0 by itself. They can be square rooted. $\sqrt{169} = 13$, so $13^2 = 169$



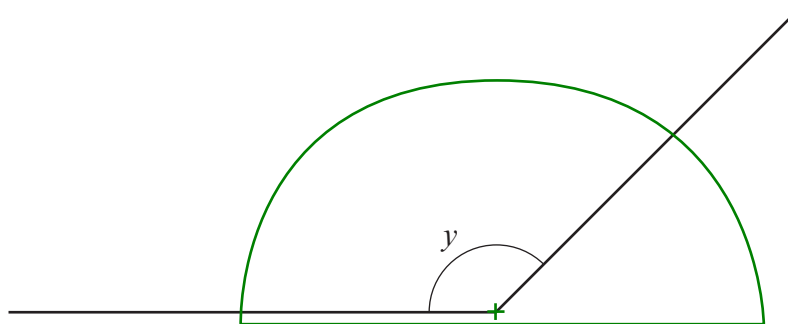
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4. (a) Measure and write down the size of angle y .

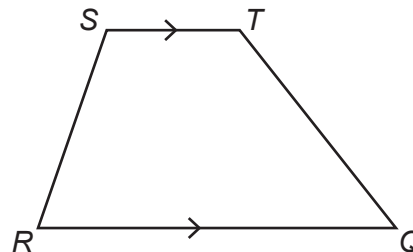
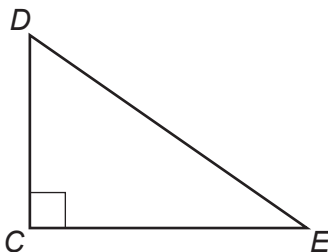
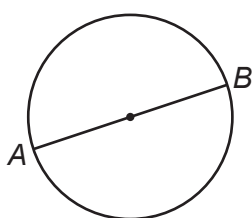
[1]



$y = 135^\circ$

Measured using a protractor

- (b) A circle, a right-angled triangle and a trapezium are shown below.



circumference

parallel

tangent

isosceles

perimeter

radius

perpendicular

diameter

Use the correct words from the list above to complete each of the following sentences.

- (i) The line AB is a diameter

[1]

- (ii) The lines CD and CE are perpendicular

[1]

- (iii) The lines ST and RQ are parallel

[1]

AB is a diameter as it is a straight line going from one side of a circle to the other which goes through the centre.

CD and CE are perpendicular as they meet at 90° .

ST and RQ are parallel as they both go in the same direction and would not meet if extended



- (c) Sadia describes a 3D shape.
She says,

One of the vertices is highlighted in green. One of the edges is highlighted in pink. One of the faces is highlighted in orange

This 3D shape has 5 vertices, 8 edges and 5 faces.

Which one of the 3D shapes listed below could be the one Sadia is describing?

Circle your answer.



[1]

cuboid

triangular prism

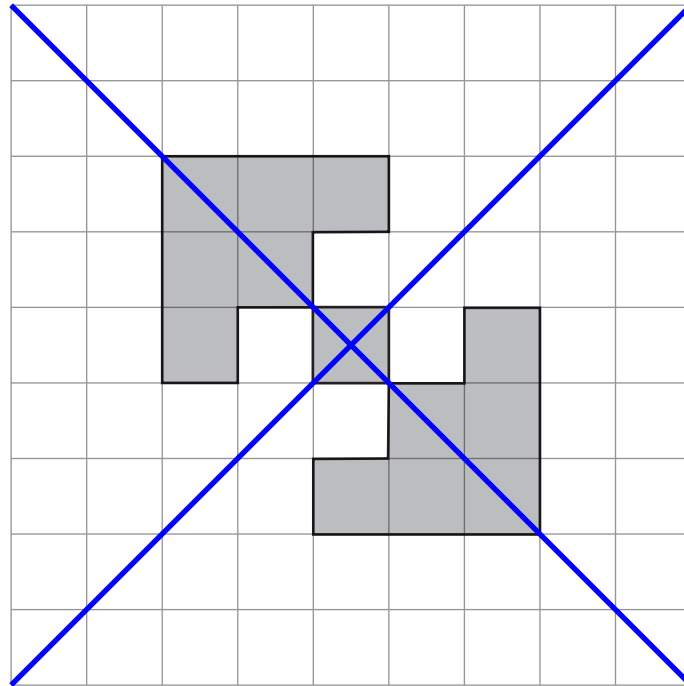
cube

square-based pyramid

cone

- (d) Mark all the lines of symmetry on the following diagram.

[2]

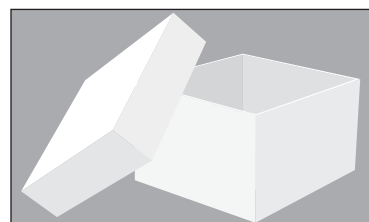


Lines of symmetry are straight lines which cut the shape into two equal halves which are a reflection of each other



5. Austin owns a cake shop.

(a) He sells his cakes in boxes.



Austin buys some boxes.

Each box costs £1.35.

He pays a total of £63.75 which includes a £3 delivery charge.

How many boxes did Austin buy?

[2]

$$63.75 - 3$$

Subtracting the £3 delivery charge from the total £63.75 finds that the boxes must have cost £60.75

$$60.75 \div 1.35$$

Dividing the £60.75 cost of the boxes by the £1.35 cost of each box finds that there is 45 boxes

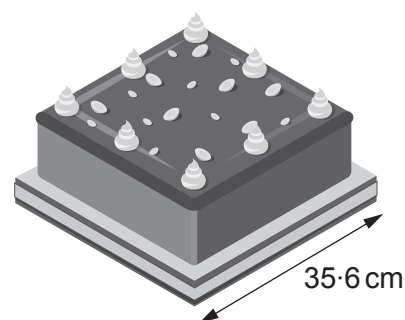
45

(b) Austin uses cake boards to display his cakes.
Each board is square with sides of length 35.6 cm.
He puts ribbon around the perimeter of the boards for decoration.

Austin has 4 metres of ribbon.

He puts the ribbon around the perimeter of **two** cake boards.

The ribbon does not overlap on either board.



How much ribbon will Austin have left over?

[4]

$$35.6 \times 4$$

Multiplying the length of each board by the 4 equal sides of the square finds that the perimeter of each board is 142.4 cm

$$142.4 \times 2$$

Multiplying the perimeter of each board by the 2 boards finds that 284.8 cm of ribbon is used

$$400 - 284.8$$

1 m = 100 cm so 4 m = 400 cm. Subtracting the 284.8 cm of ribbon used from the 400 cm of ribbon Austin has finds that 115.2 cm of ribbon is left over

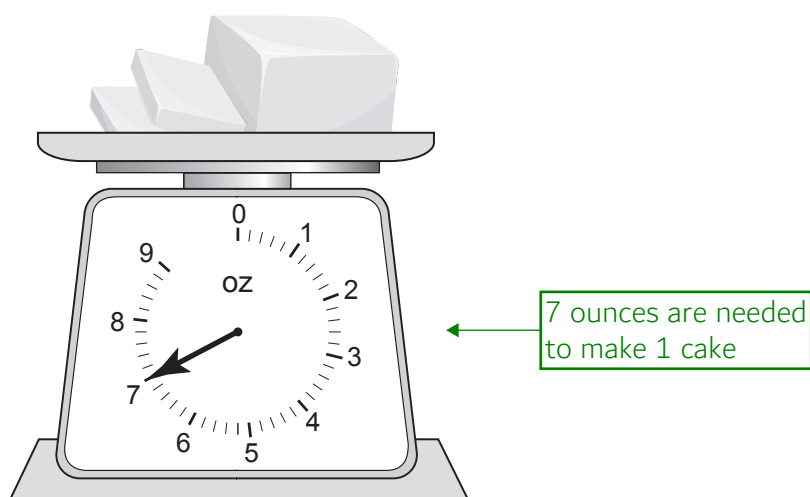
Austin will have 115.2 cm of ribbon left over.



- (c) Use the information below to convert between ounces and grams.

$$1 \text{ ounce (oz)} = 28.35 \text{ grams (g)}$$

- (i) The scales below show how many **ounces** of butter Austin uses to make 1 cake.



How many **grams** of butter does Austin need to make **3** cakes?

[2]

7×28.35 ← Multiplying the 7 ounces by the 28.35 grams in each ounce finds that 198.45 grams of butter is needed to make 1 cake

198.45×3 ← Multiplying the 198.45 grams of butter needed to make 1 cake by 3 finds that 595.35 grams of butter is needed to make 3 cakes

595.35 g

- (ii) Austin buys bags of sugar.
Each bag has a mass of 500 g.

What is the mass of one bag of sugar in **ounces**?
Give your answer to the nearest ounce.

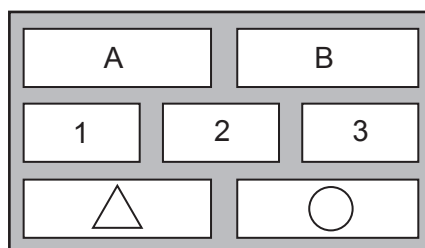
[2]

$500 \div 28.35$ ← Dividing the 500 g by the 28.35 g in each ounce finds that each bag has a mass of 17.6... ounces

18 oz ← Rounding 17.6... ounces to the nearest whole ounce



6. Jade must enter a code to open her safe by pressing three buttons. The code consists of one letter, one number and one shape.



- (a) List all the possible code combinations. One has been completed for you.

Using systematic listing

[2]

Letter	Number	Shape
A	1	△
A	1	○
A	2	△
A	2	○
A	3	△
A	3	○
B	1	△
B	1	○
B	2	△
B	2	○
B	3	△
B	3	○

You may not need to use all the lines.

- (b) Jade has forgotten her code. She enters one letter, one number and one shape at random. What is the probability that she enters the correct code?

[1]

$$\frac{1}{12}$$

1 out of the 12 possible code combinations is the correct code



7. Vikram follows a Mediterranean diet.
The table below shows the proportion of each food group Vikram should eat each day.

Vikram's Mediterranean Diet

Food group	Proportion of diet
Whole grains and pasta	36%
Vegetables and fruit	30%
Fish, meat, and dairy products	20%
Olive oil	9%
Sugar	5%

- (a) What **fraction** of the Mediterranean diet is made up of olive oil and sugar?
Write your answer in its simplest form. [2]

$$\frac{9 + 5}{100}$$

$$\frac{7}{50}$$

Adding the 9% which is olive oil and the 5% which is sugar expresses the total percentage which is made up of olive oil and sugar. Percentage is out of 100 so putting this over 100 expresses it as a fraction

The calculator gives the fraction in its simplest form

- (b) On Monday, Vikram ate 456 grams of fish, meat, and dairy products.
How many grams of sugar should Vikram have eaten on Monday? [2]

$$456 \div 20$$

$$22.8 \times 5$$

$$114 \text{ g}$$

20% should be fish, meat and dairy products. Dividing the 456 g by 20 finds that 1% of the diet should be 22.8 g

Multiplying what 1% of the diet should be by 5 finds that the 5% representing sugar should be 114 g

- (c) On Tuesday, Vikram ate a total of 1350 grams of food.
How many grams of whole grains and pasta should Vikram have eaten on Tuesday? [2]

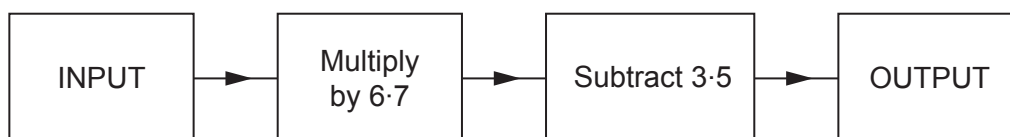
$$\frac{36}{100} \times 1350$$

$$486 \text{ g}$$

Putting the 36% over 100 converts it to a fraction. Multiplying the 1350 g by this fraction finds that 36% of the 1350 g is 486 g



8. (a) (i) The diagram shows a number machine.



When the OUTPUT is 83.6, what is the INPUT?

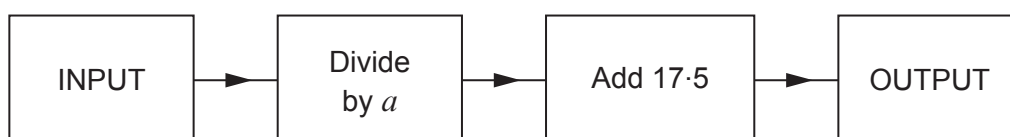
[1]

$83.6 + 3.5$ ← Going backward in the number machine from the OUTPUT to the INPUT. First doing the opposite of subtracting 3.5 to 83.6

$87.1 \div 6.7$ ← Next doing the opposite of multiplying by 6.7 to the result

13

- (ii) A different number machine is shown below.



When the INPUT is 22, the OUTPUT is 37.5.
Find the value of a .

[2]

$37.5 - 17.5$ ← Going backward in the number machine from the OUTPUT of 37.5 by doing the opposite of adding 17.5

$22 \div a = 20$ ← The INPUT divided by a must give 20

$22 = 20a$ ← Multiplying both sides by a

$a = 1.1$ ← Dividing both sides by 20 gets a on its own



- (b) The original price of a toy is $\text{£}t$.
In a sale, the toy is one third of its original price.
Write down, in terms of t , the sale price of the toy.

[1]

$$\frac{1}{3}t \leftarrow \text{Of means to multiply}$$

- (c) A bag contains x sweets.
Rona buys 8 of these bags.
She also has 5 sweets left from a previous bag of sweets.
Write down, in terms of x , the total number of sweets Rona has.
Simplify your answer.

[2]

$$8x + 5 \leftarrow \text{Multiplying the } x \text{ sweets in each bag by the 8 bags gives } 8x \text{ sweets. Adding the 5 sweets left over from the previous bags gives the total number of sweets}$$

- (d) Simplify $5f + 16f \times 7$.

[2]

$$117f \leftarrow 5 + 16 \times 7 = 117 \text{ so } 5f + 16f \times 7 = 117f$$

- (e) Expand $8(9p - 3)$.

[1]

$$72p - 24 \leftarrow 8 \times 9p = 72p \text{ and } 8 \times -3 = -24$$

- (f) Solve $5x - 2 = 11$.

[2]

$$5x = 13 \leftarrow \text{Adding 2 to both sides eliminates the } -2 \text{ on the left and gets the } x \text{ term on its own}$$

$$x = 2.6 \leftarrow \text{Dividing both sides by 5 gets } x \text{ on its own}$$

- (g) What is the square root of 31?
Give your answer correct to 2 decimal places.

[2]

$$5.57 \leftarrow \sqrt{31} = 5.567... \text{ giving this correct to 2 decimal places}$$



9. The table below shows distances between some places in New Zealand.

All distances are in kilometres (km).

New Plymouth	357	797			
Rotorua	234	670	290		
Thames	114	550	414	349	
Wellington	658	1094	718	323	380
Whakatane	298	737	205	308	165
	Auckland	Cape Reinga	Hicks Bay	Napier	Taupo

Use the table to answer the following questions.

- (a) Complete the sentence.

[1]

The distance between Thames and Hicks Bay is 414 km.

- (b) Sharon drove from Wellington to Taupo.
The journey took 4 hours and 30 minutes.

Calculate the average speed of Sharon's journey in kilometres per hour.

[3]

$$\frac{30}{60}$$

There are 60 minutes in an hour. So putting the 30 minutes over 60 converts it to 0.5 hours

$$4 + 0.5$$

Adding the 0.5 hours to the 4 hours finds that the total journey time is 4.5 hours

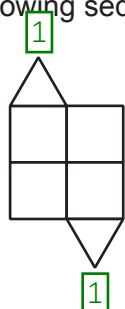
$$380 \div 4.5$$

Kilometres per hour means to divide the distance in kilometres by the time in hours. It is 380 km from Wellington to Taupo

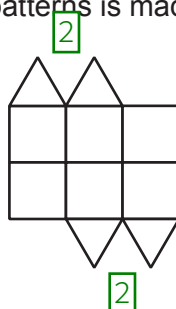
$$84.4 \text{ km/h}$$



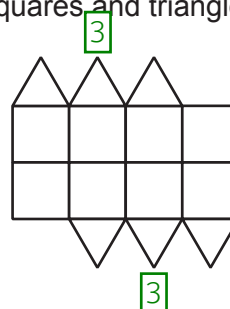
10. (a) The following sequence of patterns is made using squares and triangles.



Pattern 1



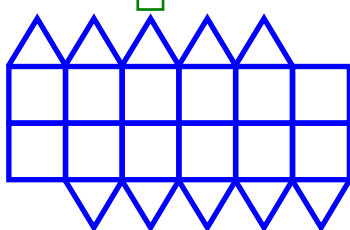
Pattern 2



Pattern 3

- (i) Draw Pattern 5 in the space below.

[1]



- (ii) Is it possible for one of the patterns in the sequence to have 23 squares and 21 triangles?
Give a reason for your answer.

[1]

Yes

☐

No

☒

The number of squares must be even

2 more squares are added between each pattern. 4, 6, 8, 10... this will always be even so cannot be 23 squares

- (iii) Write down the n th term for the number of **squares** in the pattern.

[2]

$2n + 2$

4, 6, 8, 10... this increases by 2 between each pattern so must involve $2n$.
Going backward in the sequence finds that the 0th pattern (the one before the 1st pattern) would have 2 squares so +2 is written on the end

- (b) The n th term of a different sequence is $4n - 5$.
Write down the first 3 terms of the sequence.

[2]

-1, 3, 7

Using table mode on the calculator. Define $f(x) = 4x - 5$. Start: 1. End: 3. Step: 1. This lists the first 3 terms of the sequence.

Alternatively: $4(1) - 5 = -1$ then $4(2) - 5 = 3$ then $4(3) - 5 = 7$



11. Mr Gregory plans to buy drinks and crisps for the school shop.
Drinks and crisps are sold in multipacks.
The costs for these are shown below.

Drinks multipack (28 drinks)  Price: £5.35	Crisps multipack (35 packets)  Price: £4.27
---	---

Mr Gregory buys the **least** number of each multipack so that he has an equal number of drinks and packets of crisps.

How much will this cost?
You must show all your working.

[5]

Using the calculator to find the lowest common multiple (LCM) of 28 and 35 finds that the least number of each which can be bought to get the same number of both is 140

$140 \div 28$

Dividing the 140 drinks by the 28 drinks in each multipack finds that 5 drinks multipacks are bought

$5 \times 5.35 = 26.75$

Multiplying the 5 drinks multipacks by the £5.35 cost of each multipack finds that the cost of the drinks is £26.75

$140 \div 35$

Dividing the 140 packets of crisps by the 35 packets in each multipack finds that 4 crisps multipacks are bought

$4 \times 4.27 = 17.08$

Multiplying the 4 crisps multipacks by the £4.27 cost of each multipack finds that the cost of the crisps is £17.08

$26.75 + 17.08$

Adding the £26.75 cost of the drinks and the £17.08 cost of the crisps finds that the total cost is £43.83

Total cost is £43.83



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12. (a) The exterior angle of a regular polygon is 24° .

(i) How many sides does it have? [2]

$$360 \div 24$$

$$15$$

All exterior angles of angle polygon add up to 360° . So dividing this 360° by the 24° of each exterior angle works out that there must be 15 exterior angles and so there must be 15 sides

(ii) Calculate the sum of all the interior angles of this polygon. [2]

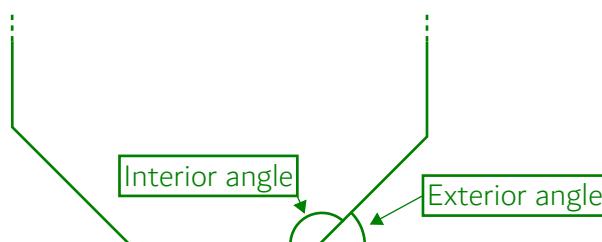
$$180 - 24$$

$$156 \times 15$$

$$2340^\circ$$

The exterior angle and interior angle lie around a point on a straight line. Angles around a point on a straight line add up to 180° . So subtracting the 24° exterior angle from this 180° finds that each interior angle is 156°

There are 15 sides so there are 15 interior angles. Multiplying the 156° of each interior angle by the 15 interior angles finds that the sum of all the interior angles of this polygon is 2340°



- (b) The diagram below shows a quadrilateral $QRST$.
 QS is parallel to UT .
 $\hat{QRS} = 84^\circ$, $\hat{RQT} = 110^\circ$ and $QR = RS$.

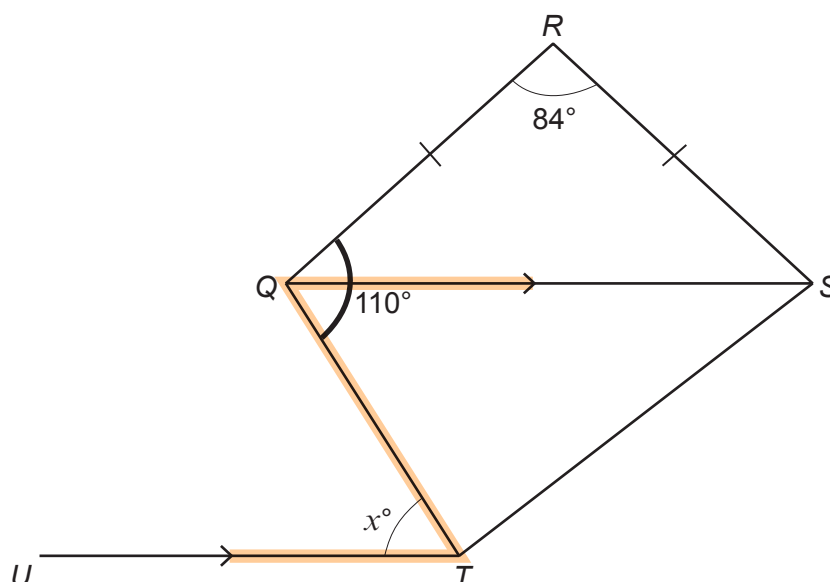


Diagram not drawn to scale

Calculate the value of x .
 Give a reason for each step of your answer.

[4]

$$180 - 84$$

$$96 \div 2$$

Angle $RQS = 48^\circ$ as angles in a triangle add up to 180°
 and the base angles of an isosceles triangle are equal

Triangle RQS is isosceles as it has two equal sides.
 The base angles are angle RQS and angle RSQ

$$110 - 48$$

$$\text{Angle } SQT = 62^\circ$$

← Subtracting angle RQS from angle RQT leaves angle SQT

$$x = 62^\circ$$

As alternate angles are equal ← The insides of the orange Z-shape are alternate angles



13. (a) Cara wants to find out if people travel abroad each year and how often. She plans to stand outside her local travel agent on Tuesday afternoon and survey 35 people. Give **two** reasons why Cara's plan is **not** likely to give reliable results. [2]

Reason 1

Biased location

People outside of a travel agent may be more likely to travel abroad if they are entering or exiting as they may be booking a holiday to travel abroad

Reason 2

Small sample

Only 35 people were asked. The more people asked, the more reliable the results

- (b) Cara uses a questionnaire to carry out her survey. One of the questions is shown below.

How many times do you travel abroad?

0	1-3	3-4	5 or more
--	--	--	--

Give **two** criticisms of the question. [2]

Criticism 1

No time period given

It should ask 'how many times do you travel abroad each year?'

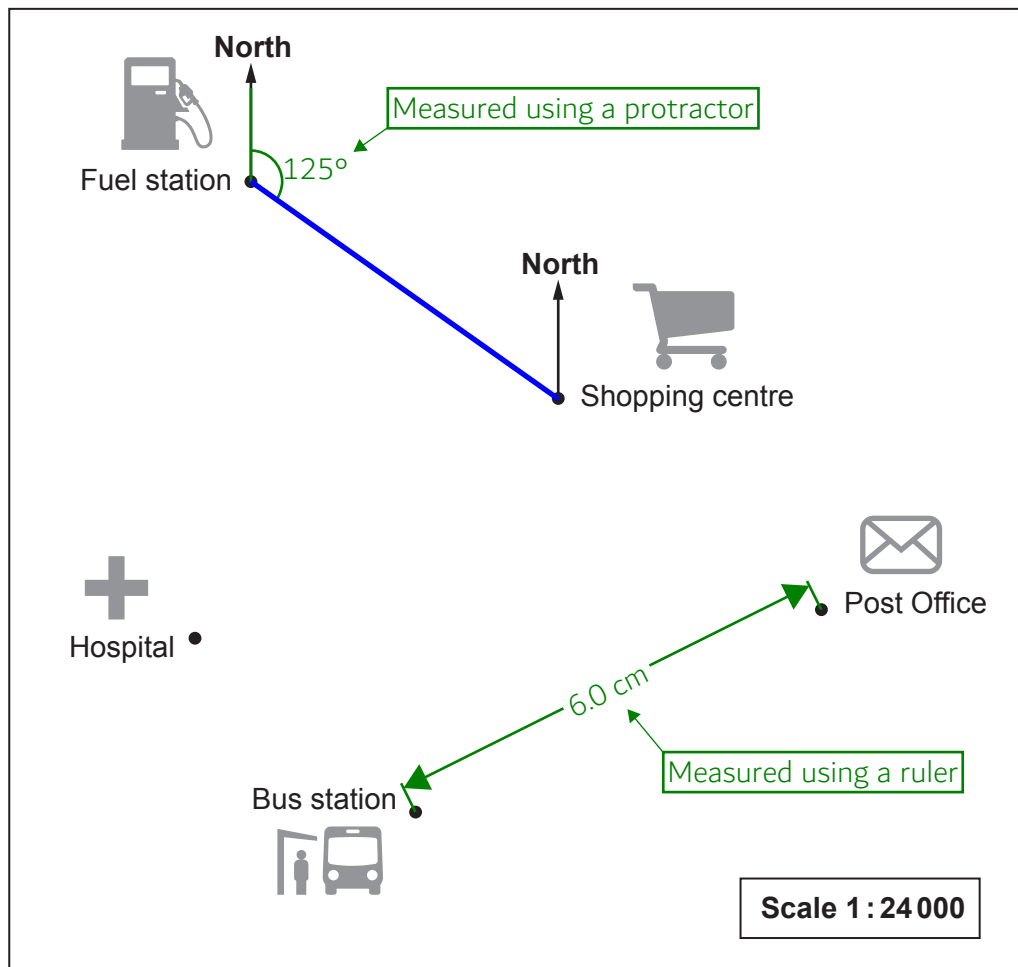
Criticism 2

3 can go in two boxes

3 can go in 1-3 or 3-4. There should be no overlap of the categories



14. The scale drawing below shows the positions of some places in a town.



- (a) What is the straight-line distance between the post office and the bus station?
Give your answer in **metres**.

[3]

6×24000 ← The 24000 is 24000 times greater than the 1 in the scale. So multiplying the measured 6 cm by 24000 finds that the actual distance is 144000 cm

$144000 \div 100$ ← 1 m = 100 cm. So dividing the 144000 cm by 100 converts it to 1440 m

1440 m

- (b) What is the bearing of the shopping centre from the fuel station?

[1]

125° ← The bearing is the angle turned clockwise from north from the fuel station to go to the shopping centre



15. Frank is making some fruit drinks.

- (a) Frank makes one drink using orange juice and lemonade in the ratio 1 : 5.
He pours 390 ml of this drink into a glass.

How many ml of lemonade will there be in the glass?

[2]

$$390 \div 6$$

1 + 5 = 6 parts in total in the ratio which represent the 390 ml total amount of drink. So dividing the 390 ml by 6 finds that 1 part of the ratio is worth 65 ml

$$65 \times 5$$

Multiplying the value of 1 part of the ratio by the 5 parts which represent the lemonade finds that there is 325 ml of lemonade

325 ml

- (b) Frank makes a different drink using apple juice and lemonade.
He pours 120 ml of apple juice into a glass.
He then pours lemonade into the glass until there is 390 ml of drink.

Write down the ratio of apple juice to lemonade in the glass.
Give your answer in its simplest form.

[2]

$$390 - 120$$

Subtracting the 120 ml of apple juice from the 390 ml of drink finds that there is 270 ml of lemonade

$$120 : 270$$

Expressing the ratio of apple juice to lemonade

The ratio is 4 : 9

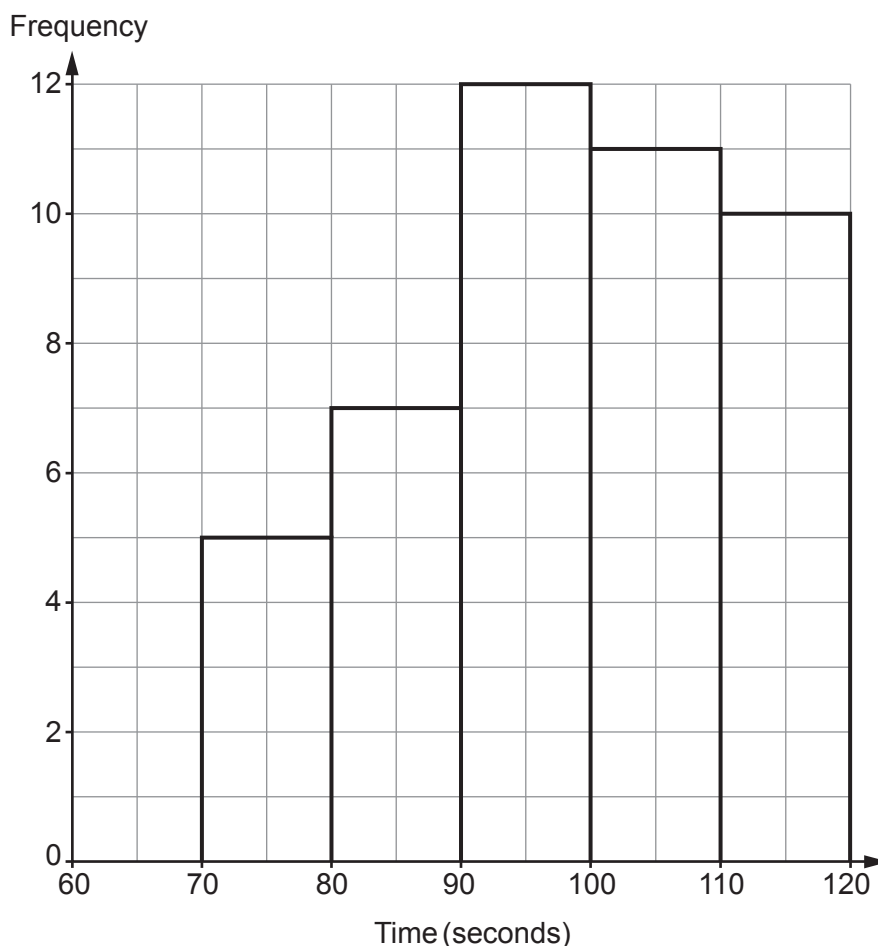
Ratios simplify in a similar way to fractions. Putting the fraction 120/270 into the calculator simplifies it to 4/9, so the ratio 120 : 270 must simplify to 4 : 9



16. 45 students took part in a 400 m race.
Their times, in seconds, were recorded.
The frequency diagram below shows the results.

The groups used are as follows:

$70 \leq \text{time} < 80$, $80 \leq \text{time} < 90$, $90 \leq \text{time} < 100$, $100 \leq \text{time} < 110$ and $110 \leq \text{time} < 120$.



Calculate an estimate for the mean time it took to complete the race.

[5]

$$75 \times 5 = 375$$

$$85 \times 7 = 595$$

$$95 \times 12 = 1140$$

$$105 \times 11 = 1155$$

$$115 \times 10 = 1150$$

$$375 + 595 + 1140 + 1155 + 1150$$

$$4415 \div 45$$

$$98.1 \text{ seconds}$$

Multiplying the midpoint of each interval by the frequency for that interval finds an estimate for the total time of all of the students in each interval

Adding all the totals for each interval estimates that the overall total of all the students is 4415 seconds

Mean = total $\div$ number, where total is the overall total time of all of the students and number is the number of students



17. (a) Factorise $x^2 - 5x - 24$.

[2]

1, 24

2, 12

3, 8

← Listing the factor pairs of 24 until they would add to -5 if one of them is negative and the other is positive

$(x - 8)(x + 3)$

← -8 and 3 add to the -5 and multiply to the -24. Putting these in brackets with x

(b) Simplify $(3h^2)^3$.

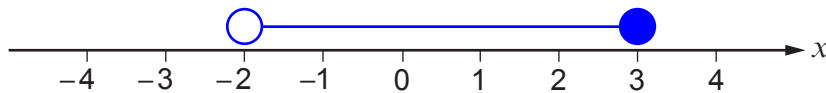
[2]

$27h^6$

← $3^3 = 27$ and $(h^2)^3 = h^6$ as $(a^x)^y = a^{xy}$

(c) Represent the inequality $-2 < x \leq 3$ on the number line below.

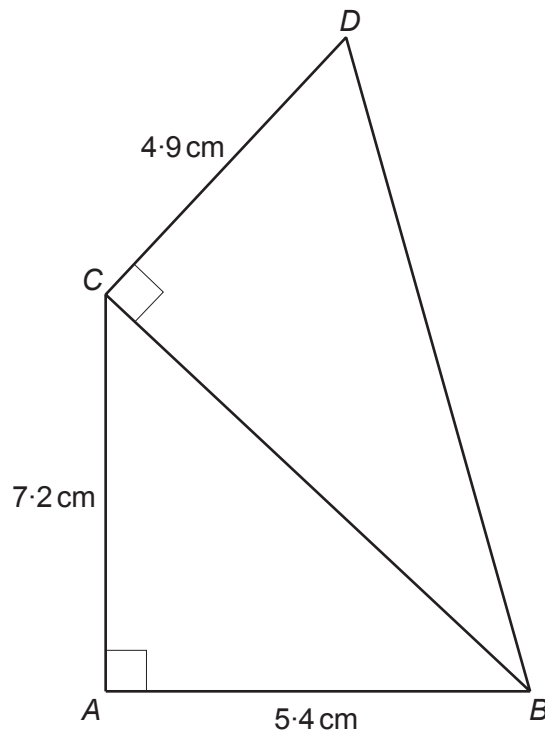
[1]



Unshaded circle means that it cannot be equal. Shaded in circle means that it can be equal. The line connecting both circles means that it is all values between the circles



18.

*Diagram not drawn to scale*

ABC and BCD are right-angled triangles.
 $AB = 5.4$ cm, $AC = 7.2$ cm and $CD = 4.9$ cm.

Calculate the area of triangle BCD .

[5]

$$7.2^2 + 5.4^2 = CB^2$$

Using Pythagoras' Theorem in right-angled triangle ABC . $a^2 + b^2 = c^2$, where a and b are the shorter sides and c is the longest side

$$CB = 9$$

Square rooting both sides eliminates to the power of 2 and gets CB on its own. CB cannot be negative

$$0.5 \times 9 \times 4.9$$

Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

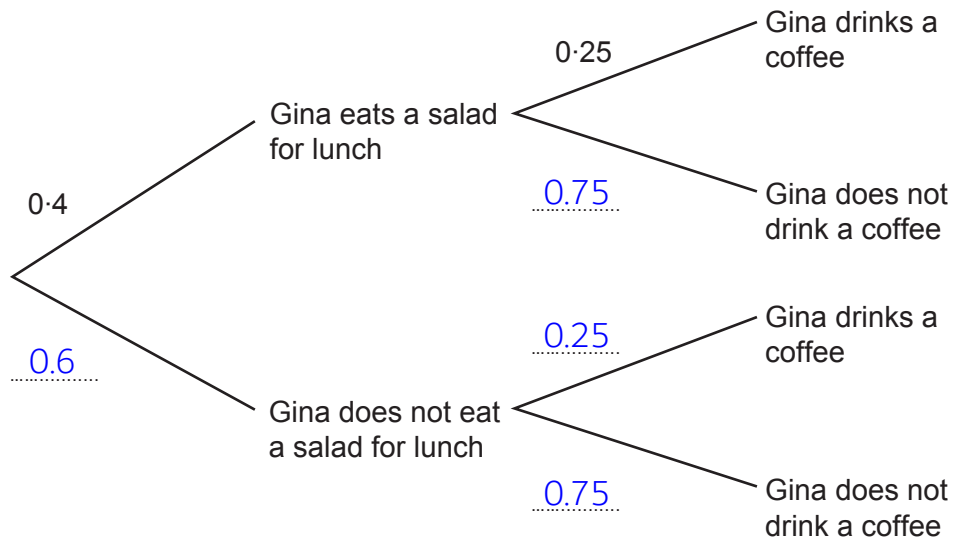
Area of triangle BCD is 22.05 cm^2



19. For her lunch, Gina sometimes eats a salad and sometimes drinks a coffee. The probability she eats a salad for lunch on a given day is 0.4. The probability she drinks a coffee on a given day is 0.25. Eating a salad for lunch and drinking a coffee are independent.

(a) Complete the following tree diagram.

[2]



Each set of branches must add up to 1. As the events are independent, the lunch has no effect on drinking coffee

- (b) Calculate the probability that, on a given day, Gina does not eat a salad for lunch but does drink a coffee.

[2]

$$0.6 \times 0.25$$

Gina does not eat a salad for lunch AND Gina drinks a coffee. AND means to multiply the probabilities

$$0.15$$



20. When a ball is dropped, the maximum height it reaches after each bounce decreases.

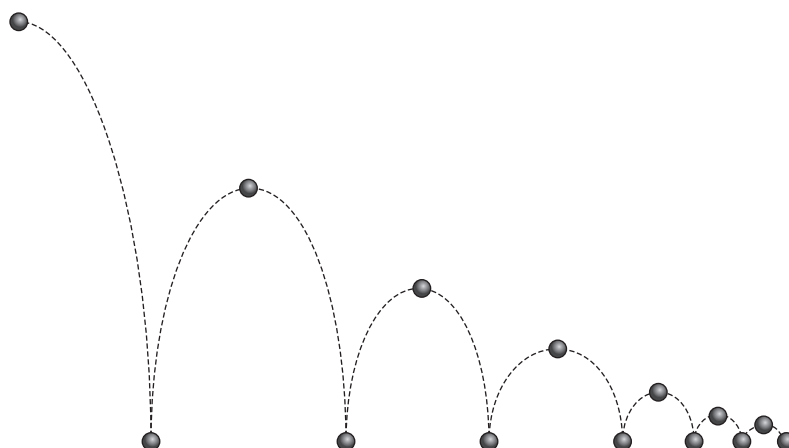


Diagram not drawn to scale

Maddox says,

Each time the ball bounces it reaches a height that is 55% of the maximum height reached on its previous bounce.

- (a) The ball is dropped from a height of 4 m.

What height will the ball reach above the ground after its 7th bounce?

[3]

$$4 \times 0.55^7$$

The compound interest formula can be used. 55% is 0.55 as a decimal multiplier. Multiplying the 4 m by 0.55 decreases it to 55% of the original value. Raising the 0.55 to the power of 7 does this 7 times

0.0609 m

- (b) (i) State any assumptions you have made in answering part (a).

[1]

What Maddox says is true

Maddox may be wrong. The question does not state that Maddox is definitely correct

- (ii) What effect could your assumption have on your answer to part (a)?

[1]

No effect

The answer to part (a) was based on the assumption



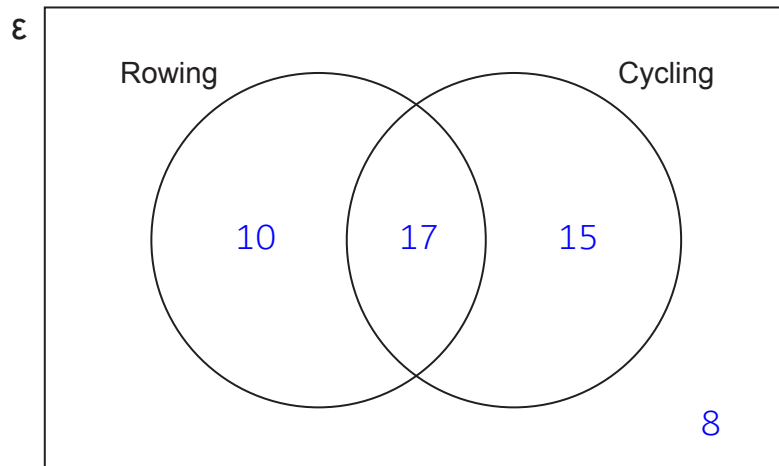
21. There are 50 people in a sports club.
Two of the sports the people can take part in are rowing and cycling.

Of these 50 people:

- 27 take part in rowing
- 32 take part in cycling
- 8 do not take part in rowing or cycling.

- (a) Complete the Venn diagram to show this information.

[2]



$$27 + 32 + 8$$

This finds that there would be a total of 67 people in the sports club if there was nobody taking part in both the rowing and the cycling

$$67 - 50$$

Subtracting the 50 people in the sports club from the 67 finds that there must be 17 people who take part in both the rowing and the cycling. Every 1 person put in the centre of the Venn diagram takes 1 off the total

$$27 - 17$$

Subtracting the 17 who take part in both from the 27 who take part in the rowing finds that 10 take part in the rowing only

$$32 - 17$$

Subtracting the 17 who take part in both from the 32 who take part in the cycling finds that 15 take part in the cycling only

- (b) One person is chosen at random from the sports club.
Find the probability that they take part in rowing but not in cycling.

[2]

$$\frac{10}{50}$$

From the Venn diagram, 10 took part in the rowing but not the cycling. This is 10 out of the 50 people



22. Abdul is travelling from the UK to Brazil for a holiday.
Abdul has £825 to exchange for Brazilian reals (R\$).
The exchange rate is £1 = 6.27R\$.
The bank Abdul uses to exchange his money only has 50R\$ notes.

What is the maximum amount of Brazilian reals Abdul can buy and what will this cost him in pounds?

Give your answer correct to the nearest penny.

You must show all your working.

[5]

$$825 \times 6.27$$

There is 825 lots of the £1 so there will also be 825 lots of the 6.27R\$. This converts the £825 to 5172.75R\$. Rounding down to the nearest multiple of 50R\$ finds that the maximum amount of Brazilian real is 5150R\$

$$5150 \div 6.27$$

Dividing the 5150R\$ by the 6.27R\$ finds how many lots of £1 it converts to

$$5150\text{R\$ costing } \pounds 821.37$$

821.371... is given in pounds to the nearest penny

23. Make R the subject of the formula $P = \sqrt[3]{RQ}$.

[2]

$$P^3 = RQ$$

Cubing both sides eliminates the cube root on the right

$$\frac{P^3}{Q} = R$$

Dividing both sides by Q gets R on its own

END OF PAPER

