

Please write clearly in block capitals.

Centre number

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 Candidate number

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Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

F

Foundation Tier

Paper 1 Non-Calculator

Thursday 15 May 2025

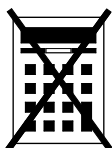
Morning

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- mathematical instruments
- the Formulae Sheet (enclosed).



You must **not** use a calculator.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

For Examiner's Use

Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
TOTAL	

Advice

In all calculations, show clearly how you work out your answer.



J U N 2 5 8 3 0 0 1 F 0 1

Please note that these worked solutions have neither been provided nor approved by AQA 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 in the spaces provided.

- 1 (a) Write down the next number in the sequence

1 $\boxed{+3}$ 4 $\boxed{+3}$ 7 $\boxed{+3}$ 10 $\boxed{+3}$

[1 mark]

Answer 13

- 1 (b) Write down the next number in the sequence

2 $\boxed{\times 2}$ 4 $\boxed{\times 2}$ 8 $\boxed{\times 2}$ 16 $\boxed{\times 2}$

[1 mark]

16
 $\times 2$
32
1

Answer 32



- 1 (c) Write down the next number in the sequence

20 -6 14 -6 8 -6 2 -6

[1 mark]

Answer

-4

Counting back 6 from 2: 1, 0, -1, -2, -3, -4

- 1 (d) Work out $3 \times (-6)$

[1 mark]

Answer

-18

$3 \times 6 = 18$ so $3 \times (-6) = -18$

Turn over for the next question

Turn over ►



- 2 Here is a card from a game.

	13		32
8		27	
	15		36

- 2 (a) Write down the number **from the card** that is a multiple of 5

[1 mark]

Answer _____ 15

Multiples of 5 end in 0 or 5

- 2 (b) Write down the number **from the card** that is a factor of 40

[1 mark]

Answer _____ 8

$40 \div 8 = 5$, so 8 is a factor of 40 as 40 is divisible by 8

- 2 (c) Write down the number **from the card** that is a prime number.

[1 mark]

Answer _____ 13

Prime numbers are only divisible by themselves and 1.
8, 32 and 36 are even so they are also divisible by 2.
27 is divisible by 3. 15 is divisible by 5

- 2 (d) Write down the number **from the card** that is a square number.

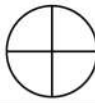
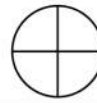
[1 mark]

Answer _____ 36

$6^2 = 6 \times 6 = 36$, so 36 is a square number as it is the result of squaring a whole number greater than 0



- 3 The pictogram shows information about the endings of street names in a town.
The key is missing.

Road	  
Close	 
Avenue	 
Lane	

In the town, there are 48 street names ending in **Close**.

How many street names end in **Avenue**?

[3 marks]

$48 \div 8$

There are 8 quarters of a circle representing the 48 street names ending in Close. So dividing this 48 by the 8 finds that 1 quarter of a circle represents 6 street names

6×5

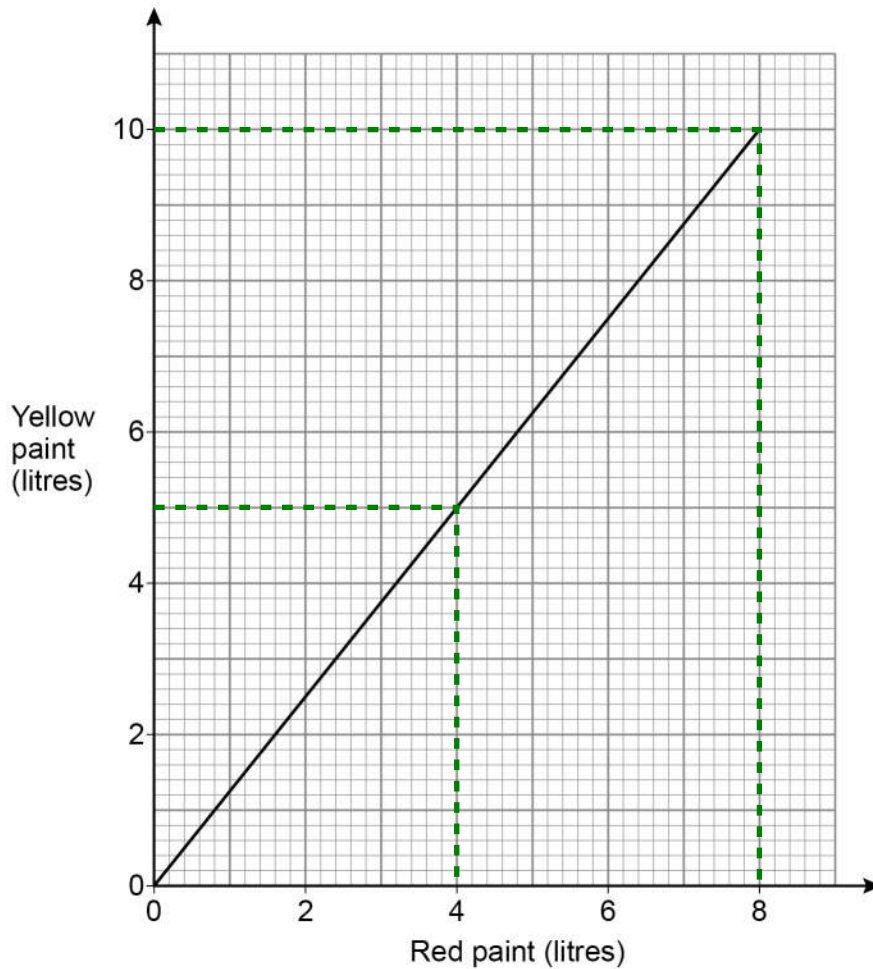
Multiplying the value of 1 quarter of a circle by the 5 (which is the number of quarter circles representing Avenue) finds that 30 street names end in Avenue

Answer 30

Turn over for the next question



- 4 Ola and Pip make orange paint by mixing red paint and yellow paint.
The graph shows how much of each colour paint to use.



- 4 (a) Ola uses 5 litres of yellow paint.

Write down how much **red** paint Ola **uses**.

[1 mark]

Reading across from 5 litres of yellow paint to the line then down to the red paint

Answer 4 litres

- 4 (b) Pip uses 10 litres of yellow paint.

How much **orange** paint does Pip **make**?

[2 marks]

10 + 8

Reading across from 10 litres of yellow paint to the line then down to the red paint finds that 8 litres of red paint is mixed with the 10 litres of yellow paint. Adding this 8 litres of red paint to the 10 litres of yellow paint finds that there is 18 litres of orange paint

Answer 18 litres



- 5 A number is divided by 8
The answer is 43 remainder 5
Work out the number.

[3 marks]

$$\begin{array}{r} 43 \\ \times 8 \\ \hline 344 \\ + 5 \\ \hline 349 \end{array}$$

Let N be the number. $N \div 8 = 43$ with a remainder of 5.
So $N = 43 \times 8$ with the remainder of 5 added back on

Answer 349

- 6 Quin buys 200 toys for £4 each.
He sells the toys for £5 each.
What is the **least** number of toys he must sell to make a profit?

[3 marks]

$$\begin{array}{r} 200 \\ \times 4 \\ \hline 800 \end{array}$$

Multiplying the 200 toys by the £4 cost of each one finds that Quin spends £800 buying the toys

$$\begin{array}{r} 160 \\ 5 \overline{) 800} \end{array}$$

Dividing the £800 by the £5 each toy is sold for finds that 160 toys must be sold in order to get the £800 back

Answer 161

One more toy is needed to be sold in order to make a profit



7 Vinyl records cost £25 each.

Offer

Buy one and get another for half price

Arif wants to buy **two** vinyl records.

He saves £8 every Saturday.

7 (a) Assume the offer is permanent.

How many Saturdays does Arif need to save for?

You **must** show your working.

[3 marks]

$$\begin{array}{r} 12.5 \\ 2 \overline{) 25.0} \end{array}$$

Dividing the £25 cost of a vinyl record by 2 finds that the half price one will be £12.50

$$\begin{array}{r} 25.00 \\ +12.50 \\ \hline 37.50 \end{array}$$

Adding the £12.50 to the £25 finds that the cost of two vinyl records using the offer is £37.50

8, 16, 24, 32, 40

Counting in 8s finds that after 5 Saturdays Arif will have saved enough as £40 is more than £37.50

Answer 5



- 7 (b) In fact, the offer is only for 1 week and there are no new offers.

What does this mean about the number of Saturdays he needs to save for?

Tick **one** box.

[1 mark]

$$\begin{array}{r} 25 \\ \times 2 \\ \hline 50 \\ 1 \end{array}$$

☐

It is less than the answer to part (a)

☐

It is the same as the answer to part (a)

☒

It is greater than the answer to part (a)

☐

It is not possible to tell

An explanation is at the bottom of this page

- 8 Here is a list of ingredients for lentil soup.

Lentil soup for 4 people	
Lentils	170 g
Water	600 ml
Onion	50 g

How many grams of lentils are needed to make this soup for 10 people?

[3 marks]

$$\begin{array}{r} 0 \ 4 \ 2 \ 5 \times 10 \\ 4 \overline{) 1 \ 7 \ 0 \ 2 \ 0} \end{array}$$

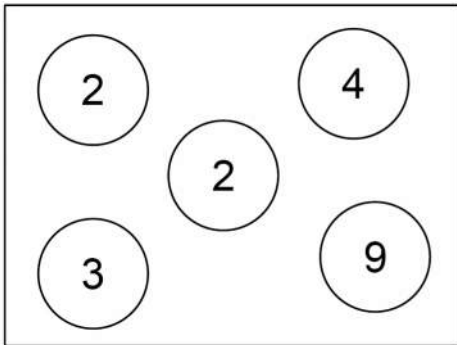
Dividing the 170 g of lentils needed for 4 people by 4 finds that 42.5 g of lentils are needed for 1 person. Multiplying this by 10 finds that 425 g of lentils are needed for 10 people

Answer 425 g

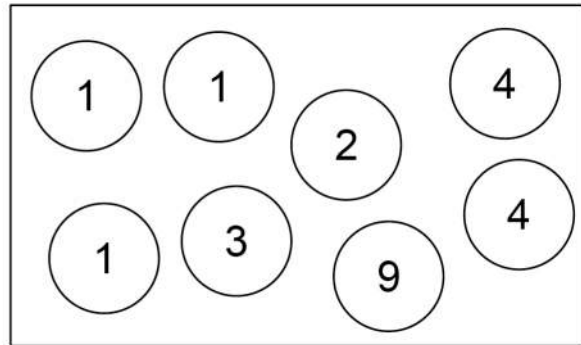
After 1 week of the offer, Arif could have saved at most £16 (assuming that the offer runs from a Saturday to a Saturday). This is not enough to buy the 1st vinyl record, which costs £25. So he will have to wait until the offer is no longer valid (assuming that the 1 week offer is from the time he starts saving). Multiplying the £25 by 2 finds that it would cost £50 for two vinyl records without the offer. From part (a), £40 could be saved in 5 Saturdays. This is not enough to buy the two vinyl records so it will take more than 5 Saturdays

- 9 Numbered discs are in two boxes.

Box A



Box B



- 9 (a) Work out the ratio

total value of the numbers in **Box A** : total value of the numbers in **Box B**

Give your answer in its simplest form.

[3 marks]

20 : 25 ← Box A: $2 + 2 + 4 + 3 + 9 = 20$. Box B: $1 + 1 + 2 + 4 + 1 + 3 + 9 + 4 = 25$. Writing this as a ratio

Dividing both sides of the ratio by 5 gets smaller whole numbers. It cannot go any simpler as 4 and 5 cannot be divided by the same amount to get smaller whole numbers

Answer 4 : 5

- 9 (b) One disc is picked at random from **Box A**.

Write down the probability that the number on the disc is greater than 6

[1 mark]

Answer $\frac{1}{5}$

1 out of the 5 discs has a number greater than 5



10 Work out the value of $2(a^2 + 3a)$ when $a = 4$

[3 marks]

$$\begin{array}{r} 16 \\ + 12 \\ \hline 28 \\ \times 2 \\ \hline 56 \\ 1 \end{array}$$

$$a^2 = 4^2 = 4 \times 4 = 16 \text{ and } 3a = 3 \times 4 = 12.$$

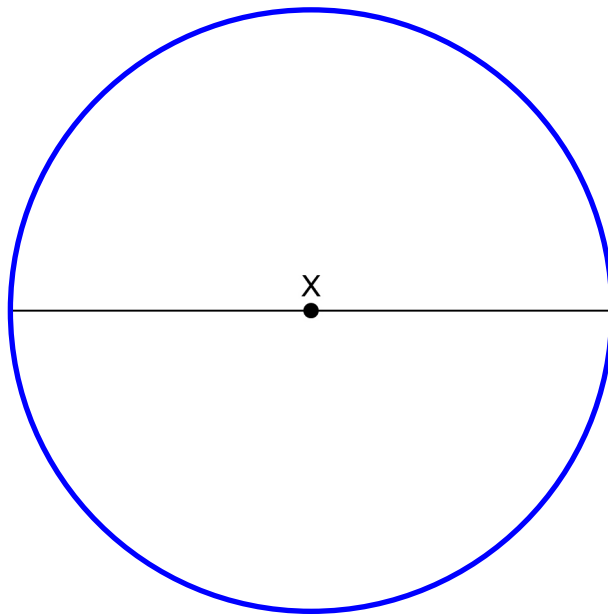
Adding these together finds that $a^2 + 3a = 28$

Multiplying by the 2 on the outside of the bracket

Answer 56

11 In this question use a pair of compasses.
The line shown is the **diameter** of a circle, centre X.
Draw the circle.

[1 mark]



The diameter is a straight line going from one side of the circle to the other which goes through the centre

Turn over for the next question



12 (a)

One day,

- a company runs 240 trains
- $\frac{1}{8}$ of these trains are late.

The company is charged £350 for each late train.

How much is the company charged that day?

[3 marks]

$$\begin{array}{r} 030 \\ 8 \overline{) 240} \end{array}$$

Dividing the 240 trains by 8 finds that $\frac{1}{8}$ of these trains is 30

$$\begin{array}{r} 350 \\ \times 30 \\ \hline 10500 \end{array}$$

Multiplying the £350 by the 30 late trains finds that the company is charged £10500

Answer £ 10500

Multiplying the £350 by the 30 late trains finds that the company is charged £10500

12 (b)

Hot drinks are sold at a station in the ratio

tea : coffee : hot chocolate = 3 : 5 : 2

2600 hot drinks are sold.

How many coffees are sold?

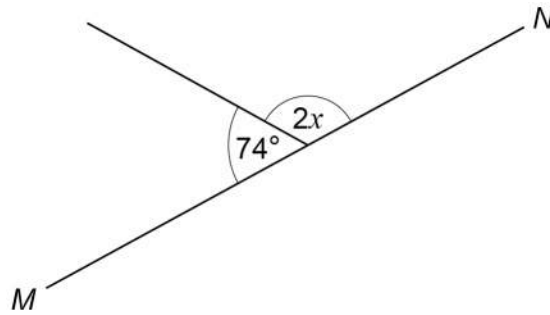
[3 marks]

$$\begin{array}{r} 1300 \\ 2 \overline{) 2600} \end{array}$$

$3 + 5 + 2 = 10$ parts in total in the ratio which represent the total 2600 hot drinks. 5 out of these 10 parts represent the coffee, which is half of the hot drinks. So dividing the 2600 hot drinks by 2 finds that there are 1300 coffees sold

Answer 1300

13

 MN is a straight line.Not drawn
accuratelyWork out the value of x .**[3 marks]**

$$\begin{array}{r} 180 \\ - 74 \\ \hline 106 \end{array}$$

There are 180° around a point on a straight line. So subtracting the 74° from 180° finds that $2x = 106$

$$\begin{array}{r} 053 \\ 2 \overline{)106} \end{array}$$

Dividing the 106° by 2 finds that $x = 53^\circ$

Answer 53°

Turn over for the next question

Turn over ►



- 14 (a)** By rounding each number to 1 significant figure, estimate the value of

$$1.98 \times 3.82 + 6.75^2$$

You **must** show your working.

$$2 \times 4 + 7^2 \leftarrow \text{Rounding each number to 1 significant figure}$$

[3 marks]

$$8 + 49 \leftarrow 2 \times 4 = 8 \text{ and } 7^2 = 7 \times 7 = 49$$

Answer _____ 57

$\uparrow$
 $8 + 49 = 57$

- 14 (b)** Is your answer to part (a) an overestimate or an underestimate?

Tick **one** box.

Overestimate

☒

Underestimate

☐

Give a reason for your answer.

Every number was rounded up $\leftarrow$ And they are all positive and are not being divided by

[1 mark]



- 15 (a) A sphere has diameter 20 cm

Show that the radius of the sphere is 10 cm

$$20 \div 2 = 10$$

Diameter is a straight line going from one side of the sphere to the other which goes through the centre. Radius is a straight line going from the centre of the sphere to the outside. So the radius is half of the diameter

[1 mark]

- 15 (b) The volume of a sphere is $\frac{4}{3}\pi r^3$ where r is the radius.

Work out the volume of a sphere with **diameter** 20 cm

Give your answer in terms of π

$$10^3$$

$$r^3 = 10^3 = 10 \times 10 \times 10 = 1000$$

$$4 \times 1000$$

Next doing the numerator of the fraction multiplied by the 1000. Not dividing by the denominator first as 1000 is not divisible by 3

[2 marks]

Answer $\frac{4000}{3}\pi$ cm³

The 4000 is not divisible by the 3 so it can be left as a fraction. Putting π next to it means that it is multiplied by π

Turn over for the next question



16 (a)

$$d = \frac{800}{w}$$

- d represents the number of days to complete a job.
- w represents the number of workers needed.

Assume the job needs completing in 20 days.

How many workers are needed?

[3 marks]

$$20 = \frac{800}{w} \leftarrow \text{Substituting the known values in the formula}$$

$$20w = 800 \leftarrow \text{Multiplying both sides by } w \text{ to eliminate } w \text{ as the denominator}$$

$$20 \overline{) 800} \begin{array}{r} 040 \\ 800 \\ \hline 000 \end{array} \leftarrow \text{Dividing both sides by 20 gets } w \text{ on its own}$$

Answer 40

16 (b) In fact, the job needs completing in **fewer** than 20 days.

What does this mean about the number of workers that are needed?

Tick **one** box.

[1 mark]

☐

It is less than the answer to part (a)

☐

It is the same as the answer to part (a)

☒

It is greater than the answer to part (a)

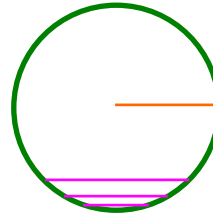
The 800 was divided by the number of days. Dividing by less will make w greater



17

A chord is drawn on a circle.

Which statement is correct?

Tick **one** box.

[1 mark]

☐

The chord must be longer than the radius.

☐

The chord must be equal in length to the radius.

☐

The chord must be shorter than the radius.

☒

The chord could be longer than, equal in length to or shorter than the radius.

A radius is drawn in orange on the circle. Three different chords are drawn in pink. One of them is longer than the radius. One of them is equal in length to the radius. One of them is shorter than the radius

18

A metal solid has volume 11 cm^3 The density of the metal is 8.5 g/cm^3

Work out the mass of the solid.

[2 marks]

 d^m_v

← Writing a formula triangle for density, mass, volume

$$\begin{array}{r}
 85 \\
 \times 11 \\
 \hline
 85 \\
 850 \\
 \hline
 935 \\
 1
 \end{array}$$

← Covering m in the formula triangle finds that mass = density $\times$ volume. Ignoring the decimal in 8.5Answer 93.5 g

There is one decimal place in 8.5 which was ignored so the final answer should be divided by 10 once



19

The table shows information about the marks of students in a test.

	Mean mark	Range of marks
School A	61	14
School B	56	21

Tick **one** box for each statement.

[3 marks]

	True	May be true	Not true
On average, School A had higher marks	☒	☐	☐
There are more students in School B	☐	☒	☐
School B had a greater spread of marks	☒	☐	☐

Mean is a type of average and is higher for School A.

There is no data on the number of students and it is impossible to work out.

Range measures the spread and this is greater for School B



20 (a) Work out $0.6 \div 100$

Give your answer in standard form.

[2 marks]

0.006 ← Dividing by 100 can be done by moving the decimal point two times to the left

Answer 6×10^{-3}

6 is at least 1 and less than 10 and must be divided by 10 3 times to get 0.006

20 (b) Work out $40 \times 30 \times 10^5$

Give your answer in standard form.

[2 marks]

1200×10^5 ← $4 \times 3 = 12$ so $40 \times 30 = 1200$

Answer 1.2×10^8

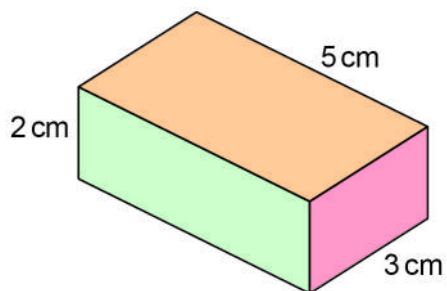
Dividing 1200 by 10 3 times gives 1.2, which is at least 1 and less than 10.
Adding 3 to the power of 10^5 multiplies it by 10 3 times to keep it the same

Turn over for the next question

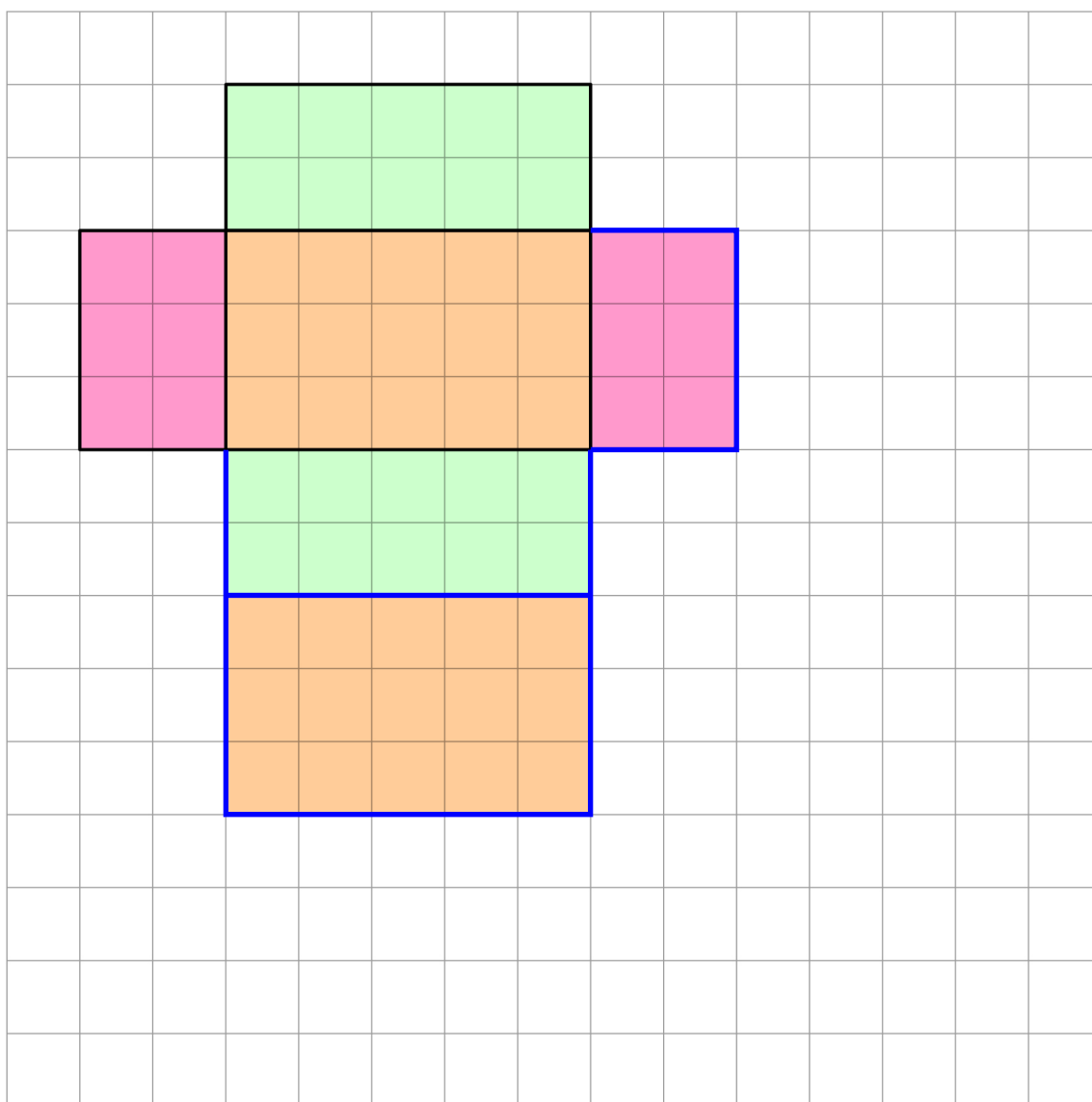


21

Here is a cuboid.

Do not write
outside the
box

Complete the drawing of the net on the centimetre grid.

[2 marks]

The net can be folded up to get the cuboid. The shaded colours are not needed but show which face is which



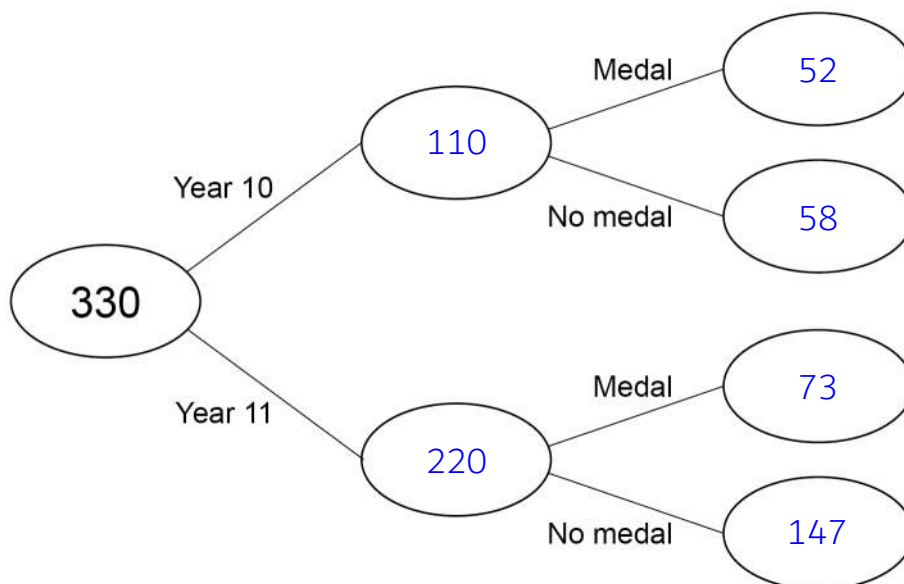
22

330 students from Year 10 and Year 11 take part in a competition.

- number of students in Year 10 : number of students in Year 11 = 1 : 2
- 125 students win a medal.
- 73 of the students who win a medal are in Year 11

Complete the frequency tree.

[4 marks]



$$\begin{array}{r} 110 \\ 3 \overline{)330} \end{array}$$

1 + 2 = 3 parts in total in the ratio which represent the 330 total students. So dividing the 330 by 3 finds that 1 part of the ratio is worth 110, which is the number of year 10 students

$$\begin{array}{r} 110 \\ \times 2 \\ \hline 220 \end{array}$$

Multiplying the value of 1 part of the ratio by 2 finds that 2 parts of the ratio are worth 220, which is the number of year 11 students

$$\begin{array}{r} 125 \\ - 73 \\ \hline 52 \end{array}$$

Subtracting the 73 year 11 students who win a medal from the 125 students who win a medal finds that 52 year 10 students win a medal

$$\begin{array}{r} 110 \\ - 52 \\ \hline 58 \end{array}$$

Subtracting the 52 year 10 students who win a medal from the 110 year 10 students finds that there are 58 year 10 students who do not win a medal

$$\begin{array}{r} 220 \\ - 73 \\ \hline 147 \end{array}$$

Subtracting the 73 year 11 students who win a medal from the 220 year 11 students finds that there are 147 year 11 students who do not win a medal

Turn over for the next question

Turn over ►



23

Work out $\frac{4}{15} + \frac{1}{5} \div \frac{1}{2}$

Give your answer as a fraction.

[3 marks]

$$\frac{1}{5} \times \frac{2}{1}$$

The order of operations (BIDMAS) must be followed so the division is done first. To divide fractions: keep the 1st fraction, change the division to a multiplication, flip the 2nd fraction

$$\frac{2}{5}$$

To multiply fractions: multiply the numerators and multiply the denominators

$$\frac{4}{15} + \frac{6}{15}$$

Multiplying both the numerator and denominator of $\frac{2}{5}$ by 3 to make the denominator 15 so that the fractions can be added

Answer $\frac{10}{15}$

To add fractions: the denominators must be the same then the numerators can be added

24

$$y = \frac{1}{x}$$

Which of these values of x gives the **greatest** value of y ?

Circle your answer.

[1 mark]

$$\frac{9}{20}$$

$$\frac{2}{5}$$

-80

95

Dividing 1 by the smallest positive amount will give the greatest value for y . $\frac{2}{5} = \frac{8}{20}$, so it is less positive than $\frac{9}{20}$



25 Circle the value of $\sin 90^\circ$

[1 mark]

0

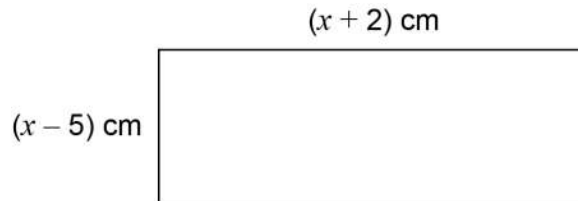
 $\frac{1}{2}$ $\frac{\sqrt{3}}{2}$

1

0 30 45 60 90
0 1 2 3 4

Writing the angles $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$. Writing 0, 1, 2, 3, 4 under these. Square rooting the 4 and putting it over 2 gives $2/2 = 1$

26

Not drawn
accuratelyThe area of the rectangle is 120 cm^2 Work out the value of x .

[4 marks]

1×8
 2×9
 3×10
 4×11
 5×12
 6×13
 7×14
 8×15

Trial and improvement can be used for this question and is easier than using an algebraic method in this case.

x must be greater than 5 as the width of the rectangle must be greater than 0.

When $x = 6$, $x - 5 = 1$ and $x + 2 = 8$. Area of rectangle = length $\times$ width. Multiplying the length of 8 cm by the width of 1 cm finds that the area of the rectangle would be 8 cm^2 if $x = 6$. This is too small so x must be greater. Increasing x by 1 increases both the length and width by 1 cm. Keep increasing until one of the pairs of length and width multiply to give 120 cm^2 . x must be 13 if $x + 2 = 15$

$x =$ 13

END OF QUESTIONS

