

Please write clearly in block capitals.

Centre number

Candidate number

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

F

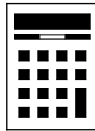
Foundation Tier Paper 3 Calculator

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



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.

Advice

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

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	
24–25	
26–27	
28–29	
30	
TOTAL	



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 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 in the spaces provided.

1 Solve $4 + x = 12$

Circle your answer.

[1 mark]

$x = -16$

$x = -8$

$x = 8$

$x = 16$

$4 + 8 = 12$

2 Circle the largest number.

[1 mark]

4.5061

4.5

4.516

4.56

All the numbers have 4 units and 5 tenths. Compare the hundredths. The one with the most is largest

3 Circle the expression that means half the value of x

[1 mark]

$\frac{x}{2}$

$\frac{2}{x}$

$\frac{1}{2} - x$

$x - \frac{1}{2}$

Circle the expression which divides x by 2



- 4 Circle the value of 10^6 [1 mark]

one hundred one thousand one million one billion

Enter 10^6 into the calculator to convert into an ordinary number

- 5 Complete the bank statement. [3 marks]

Date	Description	Credit (£)	Debit (£)	Balance (£)
01/05/2020	Starting balance			670.43
08/05/2020	Salary	2156.75		_____
11/05/2020	Water bill		48.97	_____
18/05/2020	Mortgage payment		_____	1642.49

The salary is credit so is money gained. The water bill is debit so is money paid. The mortgage payment is the difference between the balance on 11/05/2020 and 18/05/2020

Turn over for the next question

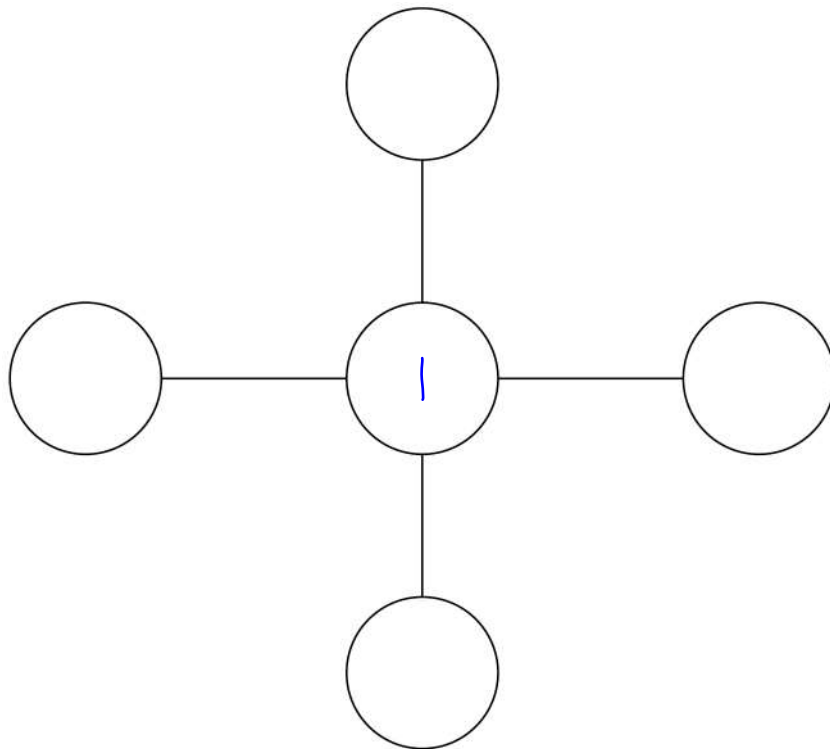


6

Put the numbers 1, 2, 3, 4 and 6 into the circles so that
each line of three numbers multiplies to 12
the total of the vertical line is one more than the total of the horizontal line.

Use each number once.

[2 marks]



- 7 Point A is 217 metres **above** sea level.
Point B is 145 metres **lower** than point A.
Point C is 59 metres **below** sea level.
How much **higher** is point B than point C?

[3 marks]

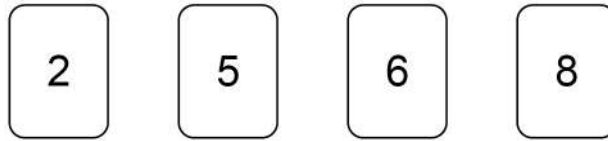


Sea level can be considered as a height of 0 so point A has a height of 217. Work out 145 less than 217 to work out the height of point B. Work out the difference between point B and point C. Point C has a negative height as it is below sea level

Answer _____ metres



8 Here are four number cards.



8 (a) Use each card once to make this calculation correct.

[1 mark]

$$\square + \square - \square - \square = 1$$

The two cards on the left of the calculation need to add together to 1 more than is being subtracted by the two cards on the right of the calculation



9

School A has 72 tutor groups.

Each group has 28 students.

School B has 16 tutor groups.

Each group has 18 students.

Show that $\frac{\text{number of students at school A}}{\text{number of students at school B}}$ is a whole number.

[2 marks]

Multiplying the number of tutor groups by the number of students in each group gives the number of students in the school. Dividing the number of students at school A by the number of students at school B should give a whole number



- 10 Boxes of chocolates each contain 25 chocolates.
One box costs £3.25
A shop has a special offer.

Two boxes for £5

How much cheaper **per chocolate** is the special offer?

[3 marks]

Dividing the price in pence by the number of chocolates gives the price per chocolate in pence. Work out the difference in the price per chocolate between using the special offer and not using the special offer

Answer _____ pence

Turn over for the next question



- 11** In a game, the player going first uses crosses and the player going second uses circles. To win the game, a player must get three crosses or three circles together in a line. The line must be horizontal, vertical or diagonal.

- 11 (a)** Here is the position in a game.

	A	B	C	D	E	F
1					O	
2				O		
3			X	X		
4				X		
5		O			O	
6		X				

It is Amy's turn to put a cross on the grid.

She wins if she puts a cross in B3

Write down **all** the other squares where she could put a cross to win the game.

[2 marks]

Answer _____

To ensure all possibilities are written, start with the top left square A1 then A2 then A3... trying every square to see if it will be a win



Amy goes first in the next game.

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						

- 11 (b) Assume that she will choose a square at random.

Write down the probability that she will put her first cross in square F6

[1 mark]

Answer _____

Express the fraction of the squares which are F6

- 11 (c) In fact, Amy decides to put her first cross into a corner square.

What does this mean about the probability that she will put her first cross in square F6?

Tick a box.

It is smaller than the answer to part (b)

It is greater than the answer to part (b)

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

Give a reason for your answer.

[1 mark]

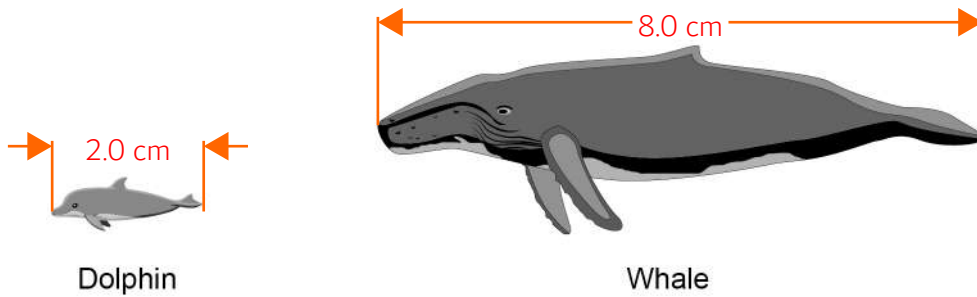
Work out the probability of picking F6 as a corner square at random by expressing the fraction of the corners which are F6. Compare this to the probability in part (a)

Turn over ►



12

A dolphin and a whale are drawn to scale.



The actual length of the dolphin is 3 metres.

Estimate the actual length of the whale.

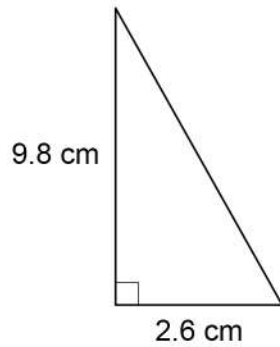
You **must** show your working.**[2 marks]**

Work out how many times longer the whale is than the dolphin. Multiply the length of the dolphin by this

Answer _____ metres



- 13 (a) Work out the area of this triangle.



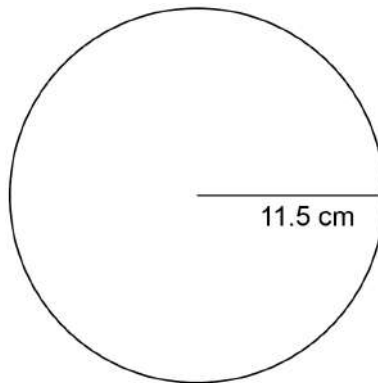
Not drawn
accurately

[2 marks]

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

Answer _____ cm^2

- 13 (b) A circle has a radius of 11.5 cm



Not drawn
accurately

Work out the area of the circle.

[2 marks]

Area of circle = πr^2 , where r is the radius

Answer _____ cm^2



14 A machine takes 4 seconds to fill a packet of crisps.

14 (a) In total, how many packets can 35 of these machines fill in 8 hours?

[4 marks]

There are 60 minutes in an hour and 60 seconds in a minute. Convert the 8 hours into seconds. Work out how many lots of 4 seconds this is. Each lot of 4 seconds is 1 packet. Then consider that there are 35 of these machines

Answer _____

14 (b) Each packet of crisps contains 32.5 grams of crisps.

At what rate does a machine put the crisps into the packets?

Give your answer in grams per second.

[2 marks]

Grams per second means to divide the grams by the seconds

Answer _____ grams per second



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

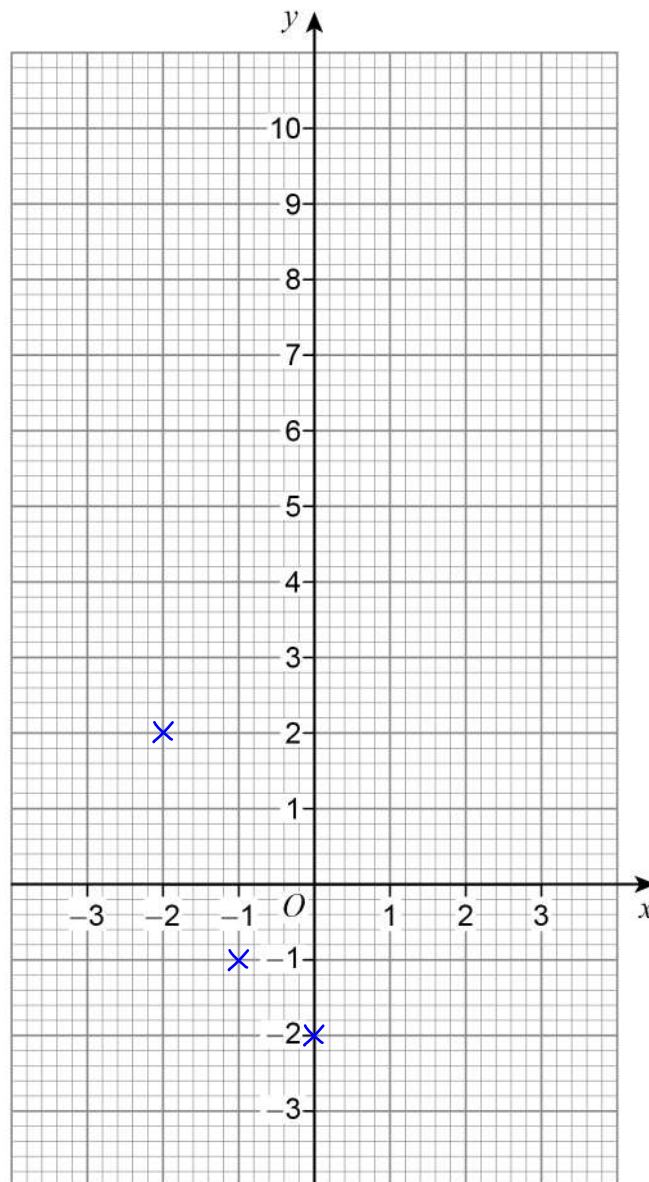
[1 mark]

x	-3	-2	-1	0	1	2	3
y		2	-1	-2	-1		

Use table mode by pressing MENU then 3.
 $f(x) = x^2 - 2$. Ignore $g(x)$. Start: -3. End: 3. Step: 1

15 (b) Draw the graph of $y = x^2 - 2$ for values of x from -3 to 3

[2 marks]



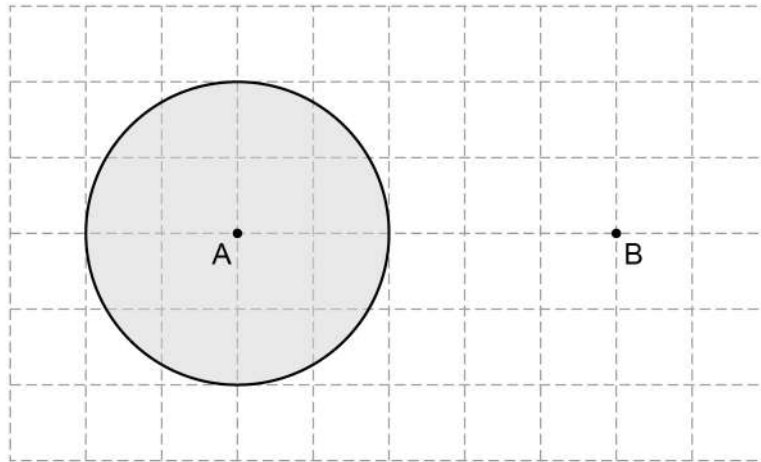
Plot all the points from the table of values then join them up with a curve

Turn over ►



16 (a) Towns A and B are shown on a centimetre grid.

Scale: 1 cm represents 10 miles



What does the shaded area represent?

Tick **one** box.

[1 mark]

All the points nearer to A than to B

~~All the points at least 30 miles from B~~

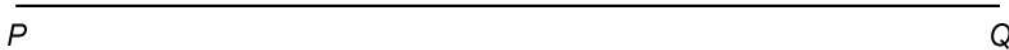
~~All the points halfway between A and B~~

All the points within 20 miles of A



- 16 (b)** Complete an accurate drawing of triangle PQR so that
 angle QPR is 53°
 the length of side PR is 7.5 cm

[2 marks]



Using a protractor measure 53° anticlockwise from the line PQ at point P . Put a mark then using a ruler draw a line which is 7.5cm long going through the mark. Then join the end of this line to point Q

- 17** Multiply out $5x(3x - 2)$

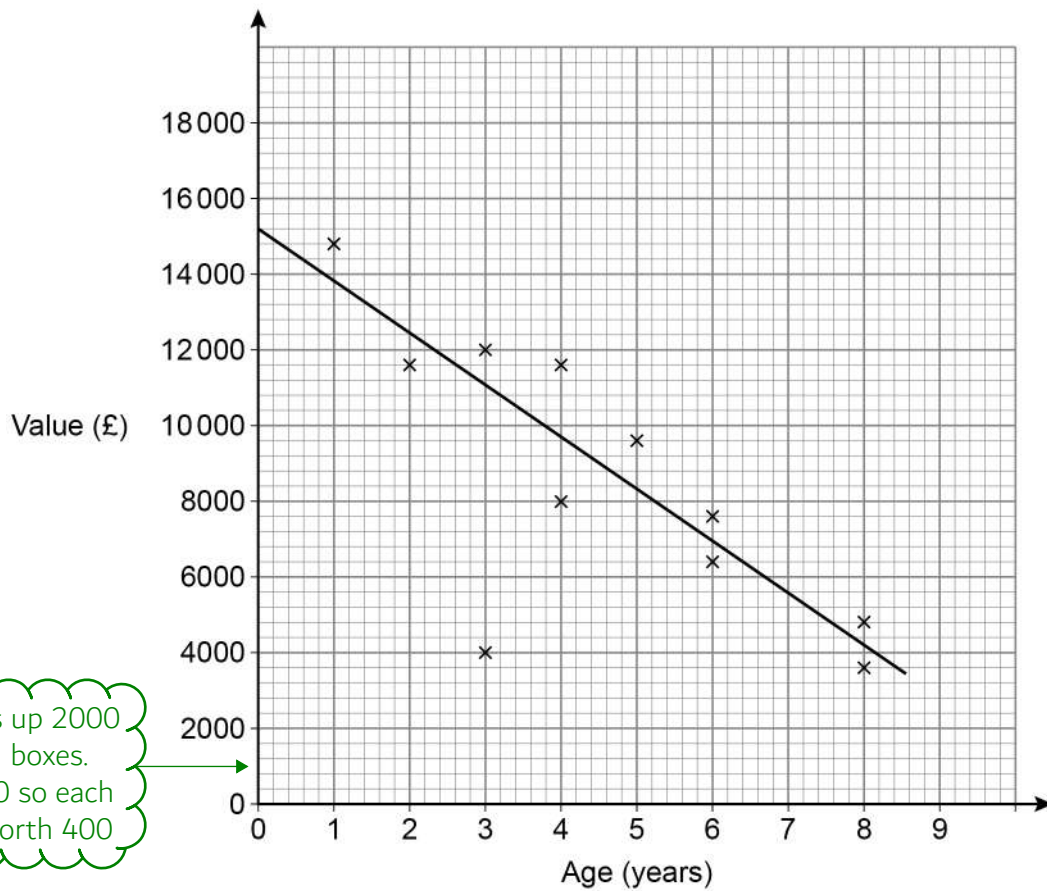
[2 marks]

Answer _____

Turn over for the next question



- 18** The scatter diagram shows the age and value of some cars in 2019
All the cars were of the same make and model.



- 18 (a)** What type of correlation does the scatter graph show?

[1 mark]

Answer _____

Positive: as one variable increases the other increases.
Negative: as one variable increases the other decreases.
None: There is no link between the two variables.
The variables are the age and the value



18 (b) Write down the value of the car that was an outlier.

[1 mark]

Answer £ _____

The outlier isn't close to the line of best fit

18 (c) Use the graph to estimate the value of a new car of this make and model in 2019

[1 mark]

Answer £ _____

A new car has an age of 0 years and can be estimated using the line of best fit

18 (d) A car of this make and model had a value of £5600 in 2019

Use the graph to estimate the year in which it was made.

[2 marks]

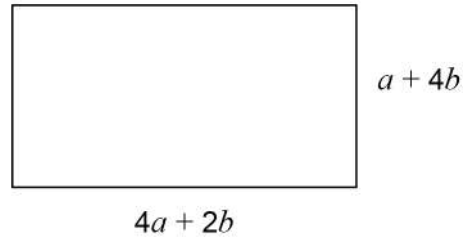
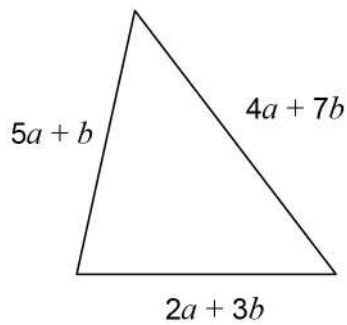
Answer _____

Draw a line across from £5600 to the line then down to the years. This estimates the age of the car. Subtracting its age from 2019 gives the year it was made

Turn over for the next question



19 Here are a triangle and a rectangle.



Not drawn
accurately

a and b are positive numbers.

Which shape has the **larger** perimeter?

You **must** work out expressions for both perimeters.

[3 marks]

Perimeter is all of the outside sides added together. Collect the like terms to get a simplified expression and the numbers of a and b can be compared. Opposite sides on a rectangle are equal. If both the a and b are greater for one of the shapes its perimeter must be larger

Tick a box.

triangle

rectangle

cannot tell



20 The n th term of a sequence is $19 - 4n$

What is the **smallest** value of n that gives a negative term?

[2 marks]

$4n$ is subtracted from 19. To be negative $4n$ needs to be greater than 19. Find the smallest value of n which would make $4n$ greater than 19

Answer _____

21 What is the name of the **longest** possible chord in a circle?

Circle your answer.

[1 mark]

tangent

circumference

radius

diameter

Chord: a straight line which connects two points on the circumference of a circle. **Tangent:** a straight line which just touches but doesn't cross a curve. **Circumference:** the outside curve of the circle. **Radius:** a straight line from the centre to the outside of a circle. **Diameter:** a straight line going through the centre of the circle which connects two points on the circumference of a circle

Turn over for the next question



22 The number of people living in a town is 47 000 to the nearest 1000

Which **one** of these is a possible number of people living in the town?

Circle your answer.

[1 mark]

46 000

46 500

47 500

48 000

To round a number to the nearest 1000 check the hundreds column. If it is a 0, 1, 2, 3 or 4 it rounds down and if it is a 5, 6, 7, 8 or 9 it rounds up

23 Jeff and Kaz share £270 in the ratio Jeff : Kaz = 2.6 : 1

How much **more** than Kaz does Jeff get?

[3 marks]

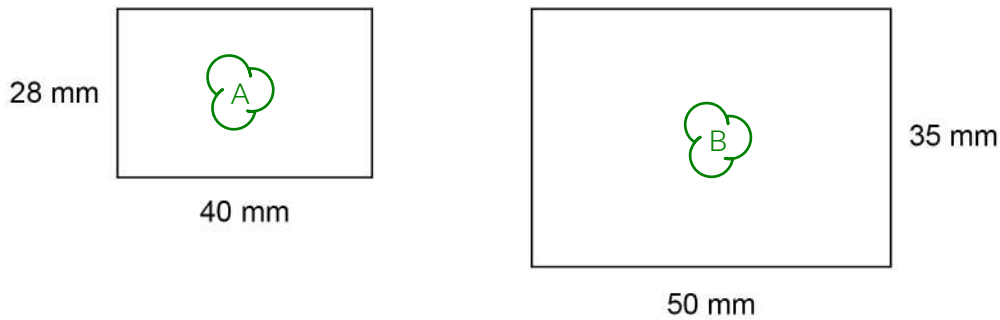
Work how many parts there are in total in the ratio. This many parts represents the £270. Work out what 1 part is worth. Work out how many parts Jeff gets more than Kaz. Multiplying this many parts by the worth of 1 part gives how much more than Kaz Jeff gets

Answer £ _____



24

Here are two rectangles.

Not drawn
accurately

Show that the rectangles are similar.

[1 mark]

Dividing the length of B by the length of A works out the scale factor between their lengths. Dividing the width of B by the width of A works out the scale factor between their widths. Show that both give the same value so all the sides on rectangle A must have been scaled by the same factor and therefore they are similar

25

The equation of a straight line is $2y = 6x + 8$

Circle the gradient of the line.

[1 mark]

6

8

3

4

The general equation of a straight line is $y = mx + c$, where m is the gradient and c is the y intercept. The equation currently has $2y$ as the subject and it needs to have y as the subject to be able to tell the gradient. Eliminate the 2 from both sides by doing the opposite of multiplying by 2 to both sides then m is the gradient



26

At a country park there is a house, a museum and a garden.
The table shows the prices per person to visit the park.

	Price per person
Garden only	Free
House and museum	£12.50
House only	£8
Museum only	£7

One day, 480 people visit the park.

67 visit the garden **only**.

40% visit the house **and** the museum.

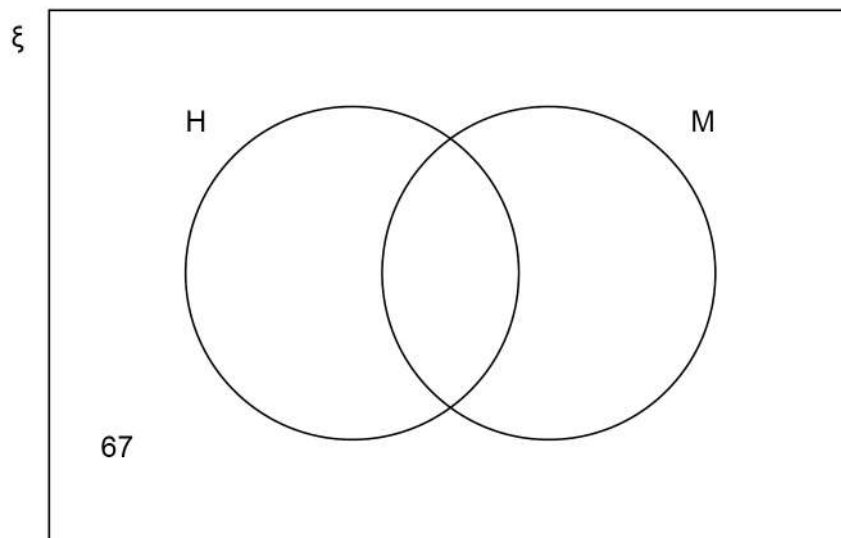
$\frac{3}{8}$ visit the house **only**.

The rest visit the museum **only**.

In total, how much do the 480 people pay to visit the park?

You may use the Venn diagram to help you.

[5 marks]



Subtracting the number of people who visited the house and the museum, the house only and the garden only leaves the number who visited the museum only. Multiplying the number of visitors to the house only by the price of visiting the house only gives the amount paid to visit the house only. Adding together the amounts paid to visit the house and the museum, the house only and the museum only gives the total amount paid. The garden is ignored as it is free

Answer £ _____

Turn over for the next question



27

The heel of a shoe exerts a pressure of 198 pounds per square inch.

Convert this pressure into kilograms per square centimetre.

Use

1 pound = 0.45 kilograms

1 square inch = 6.25 square centimetres

[3 marks]

198 x 0.45 converts the pounds into kilograms. Per means to divide and there are 6.25 square centimetres in 1 square inch

Answer _____ kg/cm²



28 Six positive numbers have
a mean of 10
a range of 19

Four of the numbers are 12 7 15 3

Work out the other two numbers.

[3 marks]

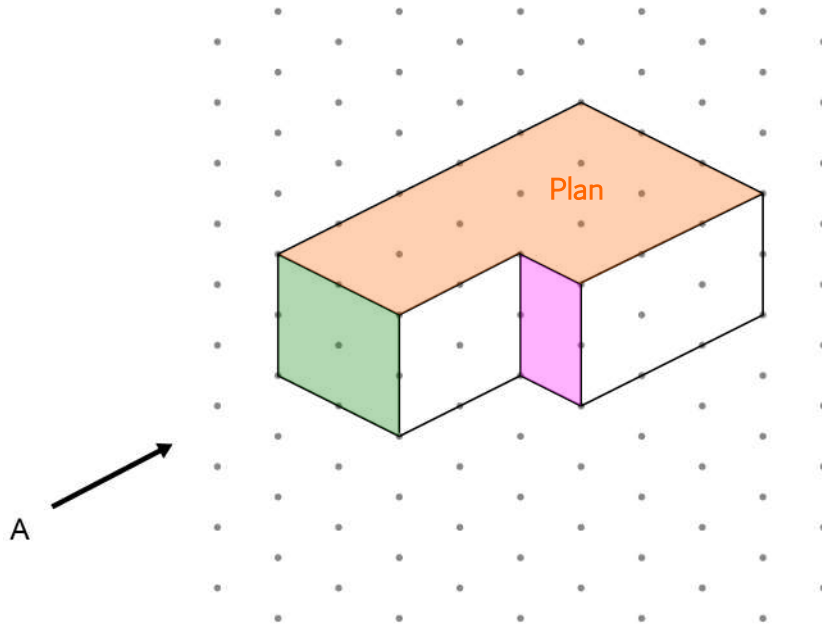
Mean = total/number so total = mean x number. Work out the total of all six of the numbers. Subtracting the four numbers leaves the total of the other two numbers. Adding the range to the smallest number gives the largest number. First assume that 3 is the smallest number and see if this assumption will work. If it doesn't, let x be the smallest number, create an equation in terms of x and the largest number and the total of the two other numbers then solve it to work out the smallest number. Then add the range to this to get the largest number

Answer _____ and _____

Turn over for the next question

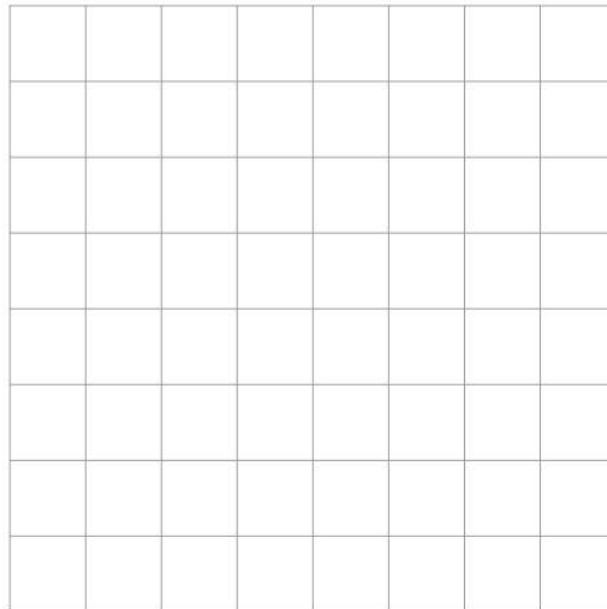


29 A solid shape is drawn on isometric paper.



29 (a) On the centimetre grid, draw the elevation of the shape from A.

[1 mark]

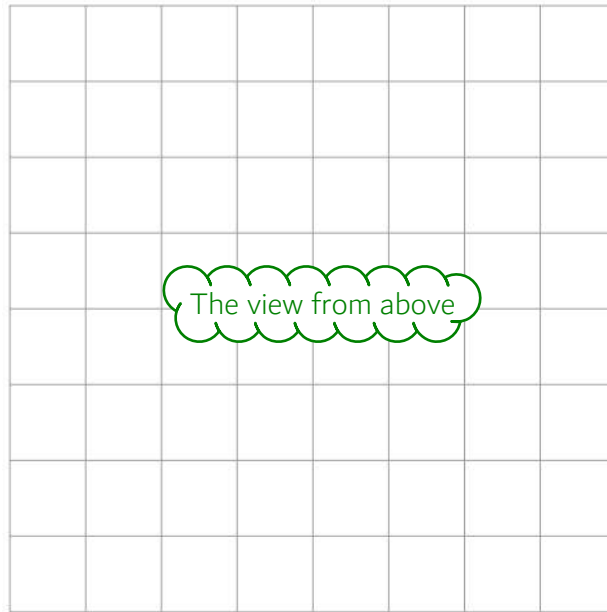


The faces shaded in green and pink will be seen in the elevation



29 (b) On the centimetre grid, draw a plan of the shape.

[1 mark]



30 Erik thinks of a prime number between 20 and 30

His number is $x\%$ of 125

Work out **one** possible value of x .

[3 marks]

Prime numbers only have two factors, themselves and 1. In other words, they cannot be divided by any number apart from themselves and 1. Write the prime he could have thought of as a fraction of 125 then convert it into a percentage

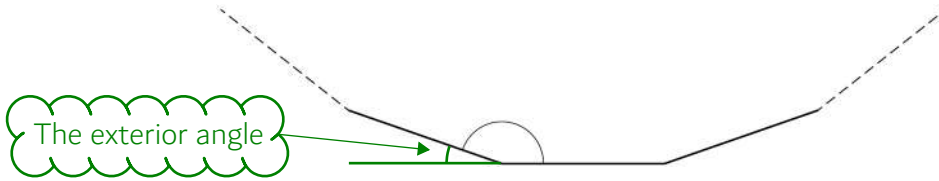
Answer _____

Turn over ►



31

Part of a regular polygon with 15 sides is shown.

Not drawn
accuratelyWork out the size of an **interior** angle.**[2 marks]**

All of the exterior angles on a polygon add up to 360° . As it has 15 sides it must have 15 exterior angles. Work out the exterior angle. The exterior angle and the interior angle lie around a point on a straight line and angles around a point on a straight line add up to 180°

Answer _____ degrees

END OF QUESTIONS