

For **AQA**

Name

Class

**GCSE**  
**Mathematics**  
**Specification**  
Paper 1 Foundation Tier

**F**

Churchill Paper 1E

1 hour 30 minutes

**Materials**

**For this paper you must have:**

- mathematical instruments

You must **not** use a calculator



**Instructions**

- Use black ink or black ball-point pen.
- Draw diagrams in pencil.
- Write your name and class in the box at the top of the 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.
- In all calculations, show clearly how you work out your answer.

**Information**

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.

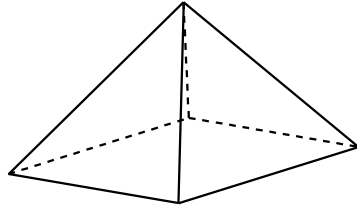


Written by Shaun Armstrong

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Answer **all** questions in the spaces provided.

- 1 How many faces does this square-based pyramid have?



Circle your answer.

[1 mark]

4

5

8

16

- 2 Which of these numbers is 8 **more** than  $-6.4$ ?

Circle your answer.

[1 mark]

$-14.4$

$-7.2$

$-1.6$

1.6

- 3 What fraction of an hour is 12 minutes?

Circle your answer.

[1 mark]

$\frac{3}{25}$

$\frac{1}{6}$

$\frac{1}{5}$

$\frac{1}{4}$

4 Work out the mean of these 5 numbers.

10 12 12 18 18

Circle your answer.

[1 mark]

12 13 13.5 14

5 Work out

5 (a)  $\frac{1}{3}$  of 18

[1 mark]

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Answer \_\_\_\_\_

5 (b) 5% of 60

[2 marks]

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Answer \_\_\_\_\_

5 (c)  $\frac{3}{5}$  of 7.5

[2 marks]

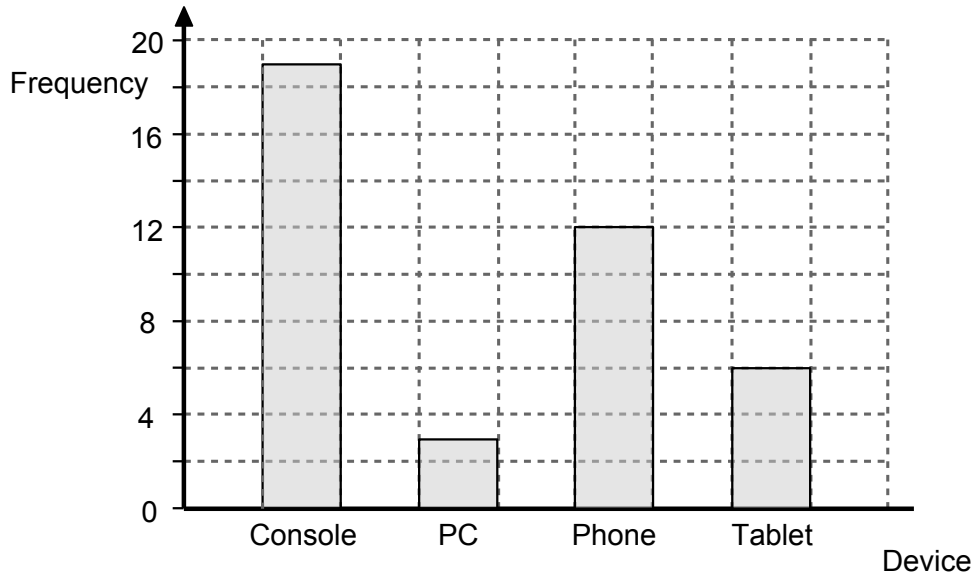
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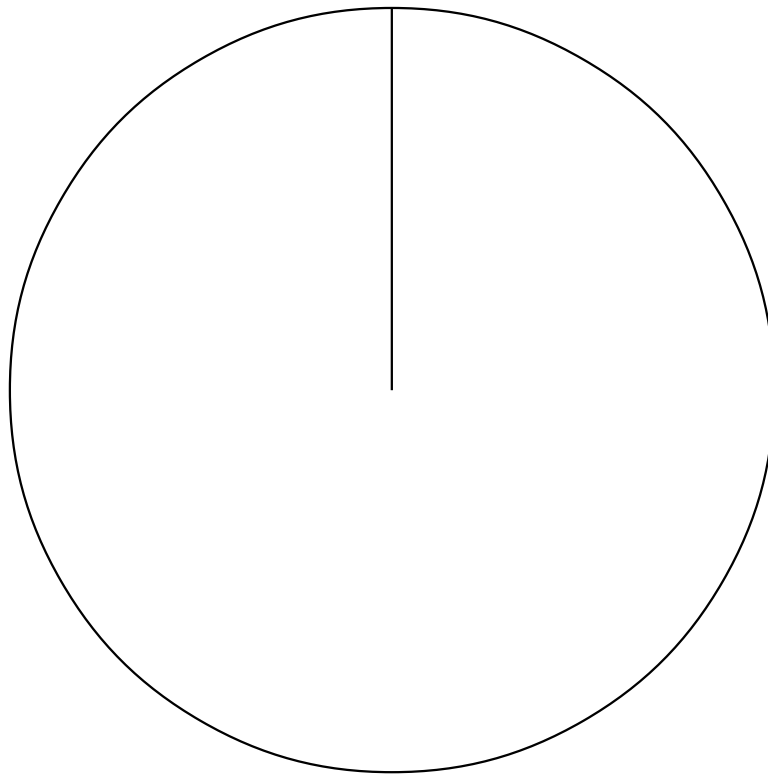
Answer \_\_\_\_\_

- 6 Tina asked 40 people who play games which device they used **most** for gaming. Her results are shown in this bar chart.



Draw an accurate pie chart to represent this information.

[4 marks]



7 Write down

7 (a) the square root of 121,

[1 mark]

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Answer \_\_\_\_\_

7 (b) the cube root of 125,

[1 mark]

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Answer \_\_\_\_\_

7 (c) the value **in words** of  $(100)^3$ .

[2 marks]

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Answer \_\_\_\_\_

8 Work out  $3 \times 1.2 + 1.6 \div 2$

Circle the answer.

[1 mark]

4.4

4.2

3.8

2.6

9 A bag contains only red, blue, green and yellow counters.

A counter is going to be picked at random from the bag.  
This table shows the probability of getting each colour of counter.

<b>Colour</b>	Red	Blue	Green	Yellow
<b>Probability</b>	0.3	$7x$	$2x$	$5x$

9 (a) Find the value of  $x$ .

[3 marks]

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Answer \_\_\_\_\_

Before a counter is picked, there are 12 red counters in the bag.

9 (b) Work out how many yellow counters there are in the bag.

[3 marks]

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Answer \_\_\_\_\_

10 In a league, after each round of matches a team gets

0 points for a loss

3 points for a draw

7 points for a home win

8 points for an away win

After playing 6 matches, *Team Epsilon* has 24 points and *Team Titan* has 21 points.

Unaza says

“Although Epsilon have more points, Titan have won more matches.”

Find out if Unaza could be correct.

You must show your working.

**[4 marks]**

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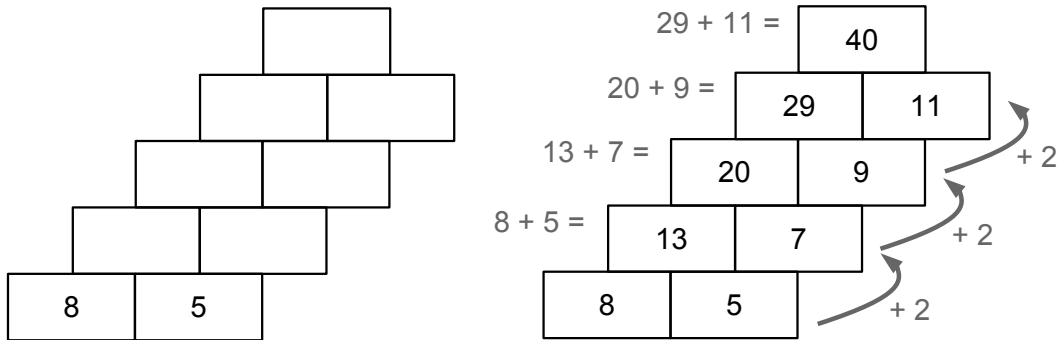
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Answer \_\_\_\_\_

- 11 A number stair starts with two numbers in the bottom row. Here the left-hand number is 8 and the right-hand number is 5.

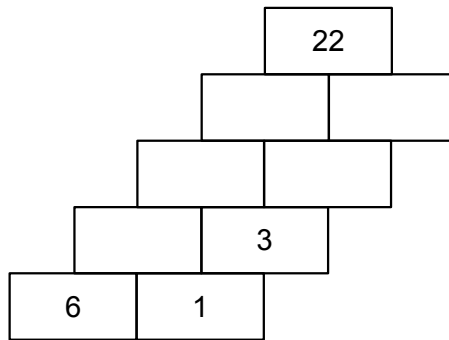


The right-hand side of the stair always goes up in twos, so here we have 5, 7, 9, 11. The left-hand side is completed by adding the two numbers in the row below as shown.

- 11 (a) Complete this number stair.

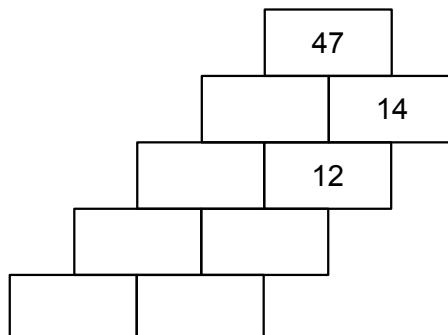
Some numbers have already been filled in.

[1 mark]



- 11 (b) Complete this number stair to find the numbers in the bottom row.

[2 marks]

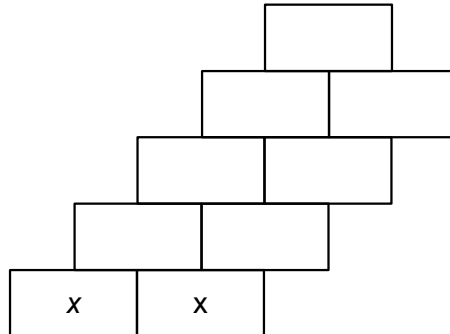




The two numbers in the bottom row can be the same.

- 11 (c) Find an expression for the number in the top row when the numbers in the bottom row are both  $x$ .

[3 marks]



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Answer \_\_\_\_\_

- 12 At a party, each child had chocolate, strawberry or vanilla ice cream.

The ratio of the number who had chocolate to the number who had strawberry was  $5 : 4$

The ratio of the number who had strawberry to the number who had vanilla was  $3 : 2$

Find the ratio of the number who had chocolate to the number who had vanilla.

Give your answer in the form  $p : q$ , where  $p$  and  $q$  are integers.

[3 marks]

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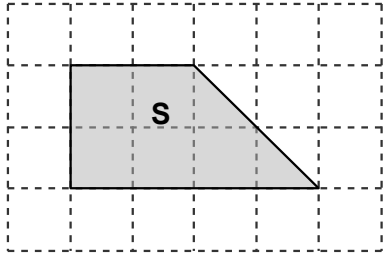
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Answer \_\_\_\_\_

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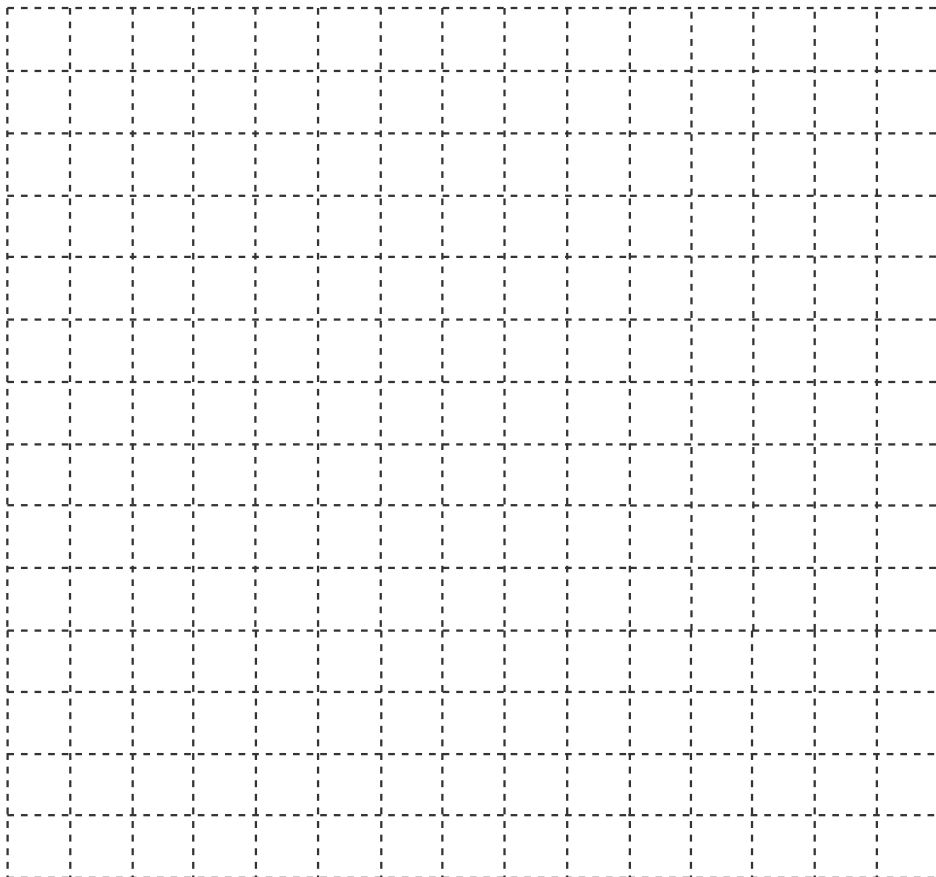
Shape **S** is shown on the grid.

13 (a) Write down the mathematical name of shape **S**.

[1 mark]

Answer \_\_\_\_\_

13 (b) On this grid, draw a shape that is an enlargement of shape **S** by a scale factor of  $2\frac{1}{2}$ .



[2 marks]

14 Work out  $\frac{3}{5} - \frac{2}{9}$

Circle the answer.

[1 mark]

$$-\frac{1}{4}$$

$$\frac{1}{45}$$

$$\frac{6}{45}$$

$$\frac{17}{45}$$

15 A bag contains only red, green and yellow beads.

$\frac{2}{5}$  of all the beads in the bag are red.

The number of green beads is  $\frac{5}{8}$  of the number of red beads in the bag.

Work out the number of yellow beads as a fraction of the number of red beads in the bag.

[4 marks]

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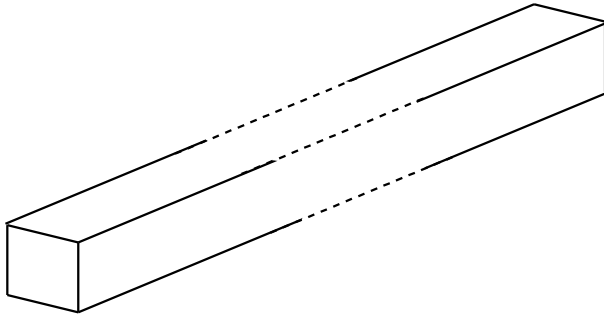
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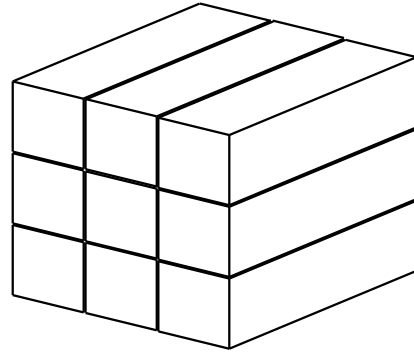
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Answer \_\_\_\_\_

16



Not drawn accurately



A rod of wood has a square cross-section.  
The rod is cut into 9 identical pieces.  
When put together as shown, the pieces form a cube of volume  $64 \text{ cm}^3$ .

Work out the dimensions of the rod before it was cut up.

[4 marks]

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Answer \_\_\_\_\_ cm by \_\_\_\_\_ cm by \_\_\_\_\_ cm

17 80 students are asked about public transport in their town.

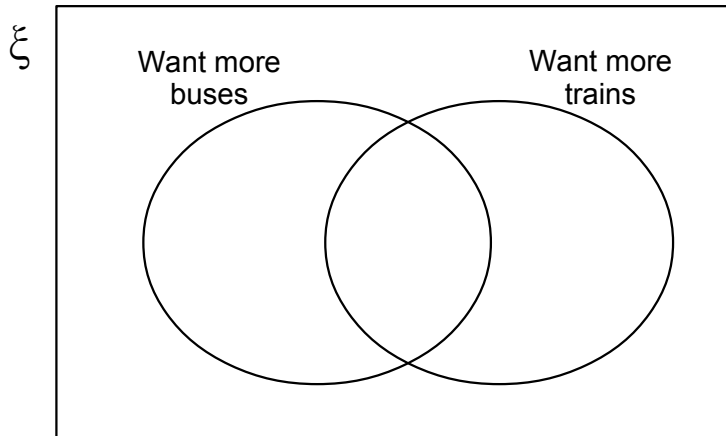
60 of the students wanted more buses.

22 of the students who wanted more buses did not want more trains.

53 of the students wanted more trains.

17 (a) Complete this Venn diagram for these 80 students.

[3 marks]



17 (b) What fraction of the students who **didn't** want more buses **did** want more trains?

[1 mark]

\_\_\_\_\_

Answer \_\_\_\_\_

**18** Here is a calculation

$$58 \times 83 = 4841$$

Amy says

“The answer must be wrong because  $8 \times 3 = 24$ .”

Amy is correct.

**18 (a)** Explain why Amy has worked out  $8 \times 3$  and how she has reached her conclusion.

**[2 marks]**

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**18 (b)** Here are three calculations.

$34 \times 406 = 13\,804$

$47 \times 388 = 18\,632$

$79 \times 625 = 49\,375$

Use Amy's method to find out if any of these calculations must be wrong.

Show your reasoning clearly.

**[2 marks]**

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Answer \_\_\_\_\_

**19** Liam plans to get fit using a treadmill.

In the first week of the year, he will spend 1 hour on the treadmill.  
Each week, he will increase the amount of time he spends on it by 10 minutes.  
For example, in the second week of the year, he will spend 1 hour 10 minutes on the treadmill.

**19 (a)** Work out how long Liam spends on the treadmill in the fifth week of the year. **[2 marks]**

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Answer \_\_\_\_\_

**19 (b)** Work out in which week of the year Liam spends 3 hours on the treadmill. **[2 marks]**

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Answer \_\_\_\_\_

Liam's friend Naz says

“It's impossible to keep increasing the time like that for a year – there aren't enough hours in a week!”

**19 (c)** Is Naz correct?  
Use calculations to show how you decide. **[3 marks]**

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Answer \_\_\_\_\_

**20** Jen spends  $\frac{3}{8}$  of her income on rent.

$\frac{6}{11}$  of the money she has left after paying rent goes on food and other living expenses.

She saves the rest of her income.

Work out the fraction of her total income that Jen saves.

**[3 marks]**

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Answer \_\_\_\_\_

**21 (a)** Solve the inequality  $\frac{1}{2}x + 9 > 3(x - 2)$

**[2 marks]**

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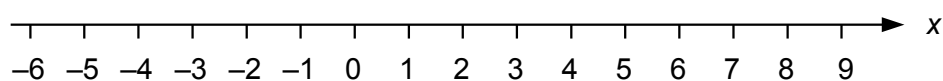
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Answer \_\_\_\_\_

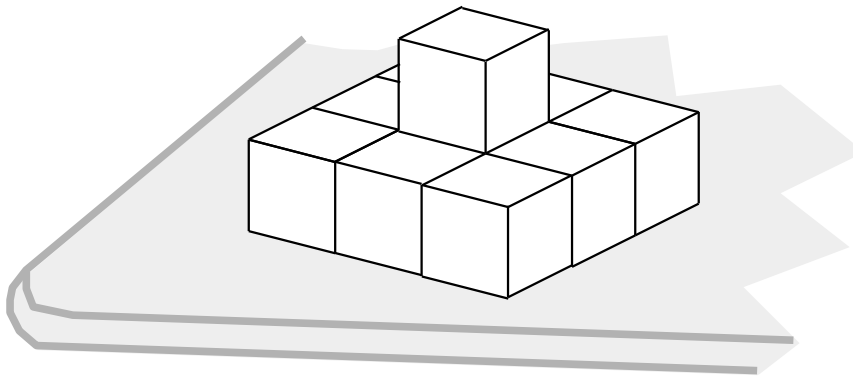
**21 (b)** Represent your solution to part (a) on this number line.



**[1 mark]**



22



Not drawn accurately

10 centimetre cubes are stuck together to make the solid shape shown above.

22 (a) Work out the surface area of the shape.

[2 marks]

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Answer \_\_\_\_\_ cm<sup>2</sup>

The shape is resting on a table with the largest side touching the table as shown above. The shape exerts pressure of 800 N/m<sup>2</sup> on the table.

The shape is now turned upside down so it rests on one face of a single cube.

22 (b) Work out the pressure the shape now exerts on the table.

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

[2 marks]

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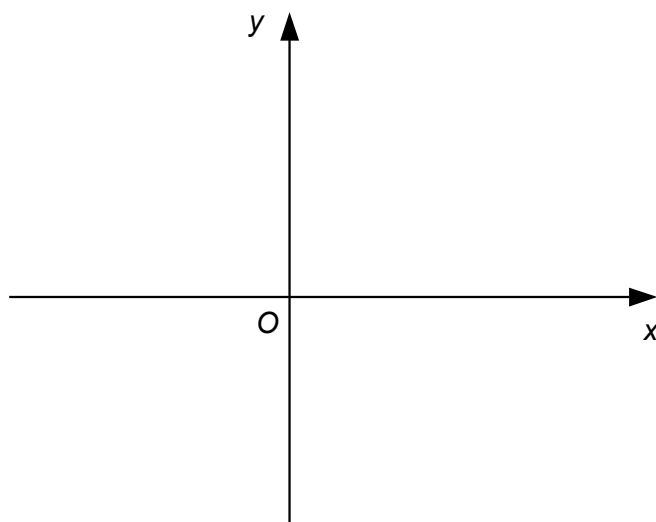
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Answer \_\_\_\_\_ N/m<sup>2</sup>

23 (a) On the axes below, sketch the graph of  $y = \frac{1}{x}$

[1 mark]



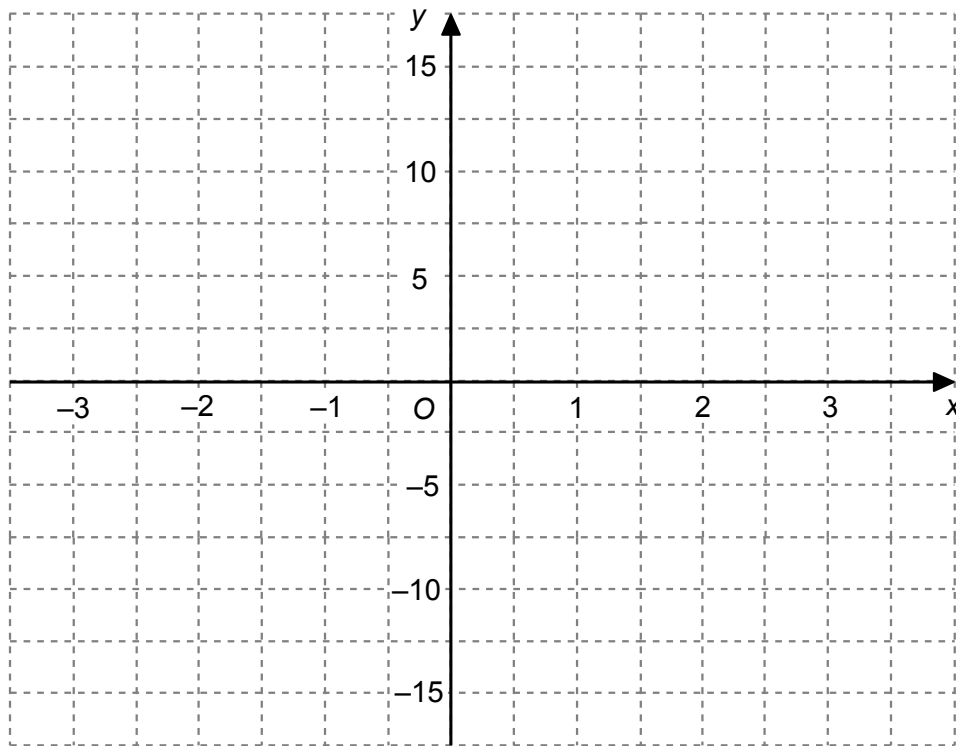
23 (b) Complete this table of values for  $y = x^3 - 4x$

[1 mark]

$x$	-3	-2	-1	0	1	2	3
$y$	-15	0	3	0			15

23 (c) On the axes below, draw the graph of  $y = x^3 - 4x$  for values of  $x$  from  $-3$  to  $3$ .

[2 marks]



**24 (a)** There are three-quarters of a million bacteria in a dish.

The number of bacteria doubles every 40 minutes.

Circle the number of bacteria there will be in the dish after 4 hours.

**[1 mark]**

12 million

24 million

48 million

96 million

**24 (b)** The value, £ $P$ , of a car after  $T$  years is given by the formula

$$P = 8000 \times 0.63^T$$

Circle the annual percentage decrease in the value of the car.

**[1 mark]**

0.63%

37%

50.4%

63%

**END OF QUESTIONS**