



# GCSE Mathematics Specification (8300/3F)

# F

Paper 3 Foundation tier

Date

Morning

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 bottom 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.
- Do all rough work in this book.
- 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.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Please write clearly, in block capitals, to allow character computer recognition.

Centre number

Candidate number

Surname

Forename(s)

Candidate signature \_\_\_\_\_

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

**1** Here are seven numbers.

13      6      12      7      6      4      8

**1 (a)** Work out the range of the seven numbers.

Circle your answer.

**[1 mark]**

5      6      7      8      9

**1 (b)** What is the mode of the seven numbers?

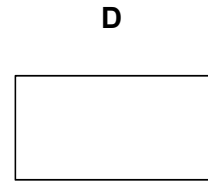
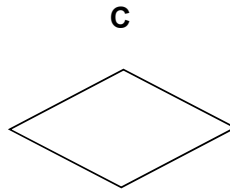
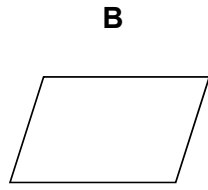
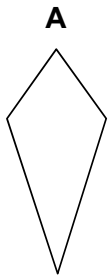
Circle your answer.

**[1 mark]**

5      6      7      8      9

2 Which shape has **two** lines of symmetry **and** its diagonals intersecting at  $90^\circ$ ?  
Circle the correct letter.

[1 mark]



3 Which of these is a cube number?  
Circle your answer.

[1 mark]

3

9

27

100

**Turn over for the next question**

**4** Liz buys a car for £7500

She pays a deposit of £1875

She pays the rest in 36 equal monthly payments.

Work out the amount of each monthly payment.

**[3 marks]**

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Answer £ \_\_\_\_\_

**5** 120 men and 80 women were asked if they drive to work.

Altogether  $\frac{1}{4}$  of the people said yes.

$\frac{1}{3}$  of the men said yes.

What fraction of the women said yes?

**[4 marks]**

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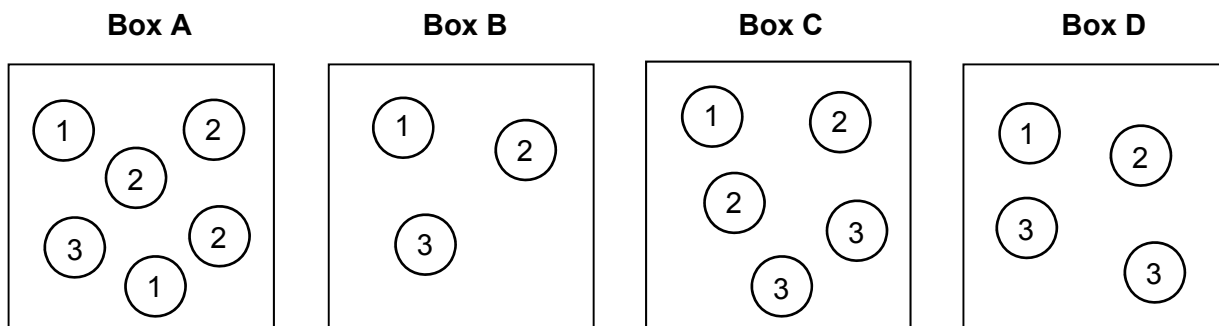
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Answer \_\_\_\_\_

6 Boxes A, B, C and D contain balls with numbers on them.



A ball is picked at random from each box.

6 (a) Which box gives the **greatest** chance of picking a 3?  
 You **must** show your working.

[2 marks]

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Box \_\_\_\_\_

6 (b) Which two boxes give the **same** chance of picking a 1?

[1 mark]

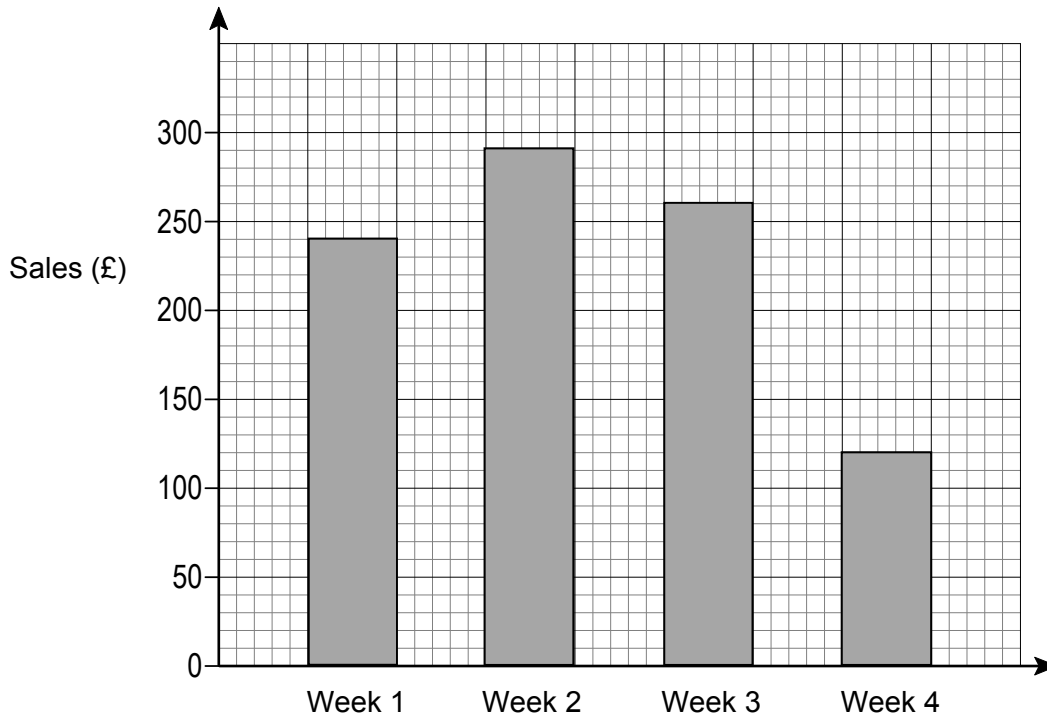
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Box \_\_\_\_\_ and Box \_\_\_\_\_

7 Zayn records his weekly sales.



Every week his costs are £87.50

7 (a) Work out his profit in Week 1

[2 marks]

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Answer £ \_\_\_\_\_

7 (b) His sales in Week 4 were half of his sales in Week 1

Zayn says,

“This means that my profit in Week 4 was half of my profit in Week 1”

Is he correct?

You **must** show your working.

[2 marks]

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8 Work out the value of  $5x + 9y$  when  $x = 7$  and  $y = -2$

[2 marks]

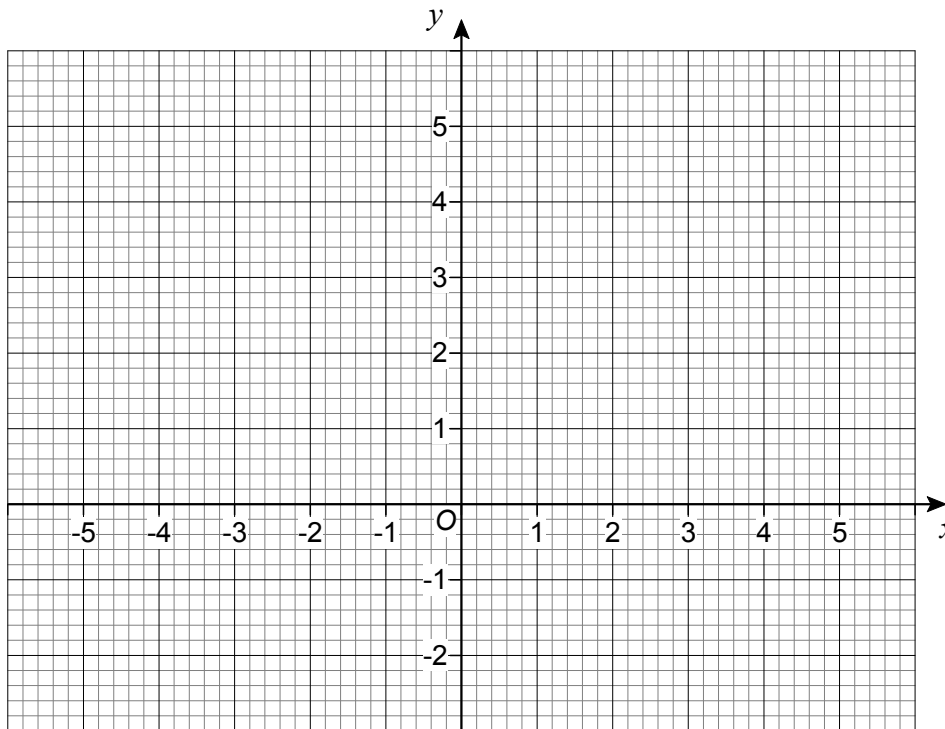
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Answer \_\_\_\_\_

9 The points  $(-1, 0)$  and  $(1, 4)$  are the diagonally opposite corners of a square.

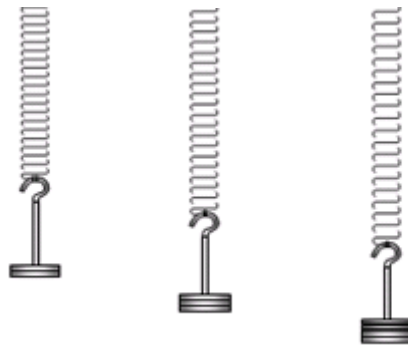


Work out the coordinates of the other **two** corners of the square.

[2 marks]

Answer ( \_\_\_\_\_ , \_\_\_\_\_ ) and ( \_\_\_\_\_ , \_\_\_\_\_ )

**10** In an experiment, different masses are hung on a spring.

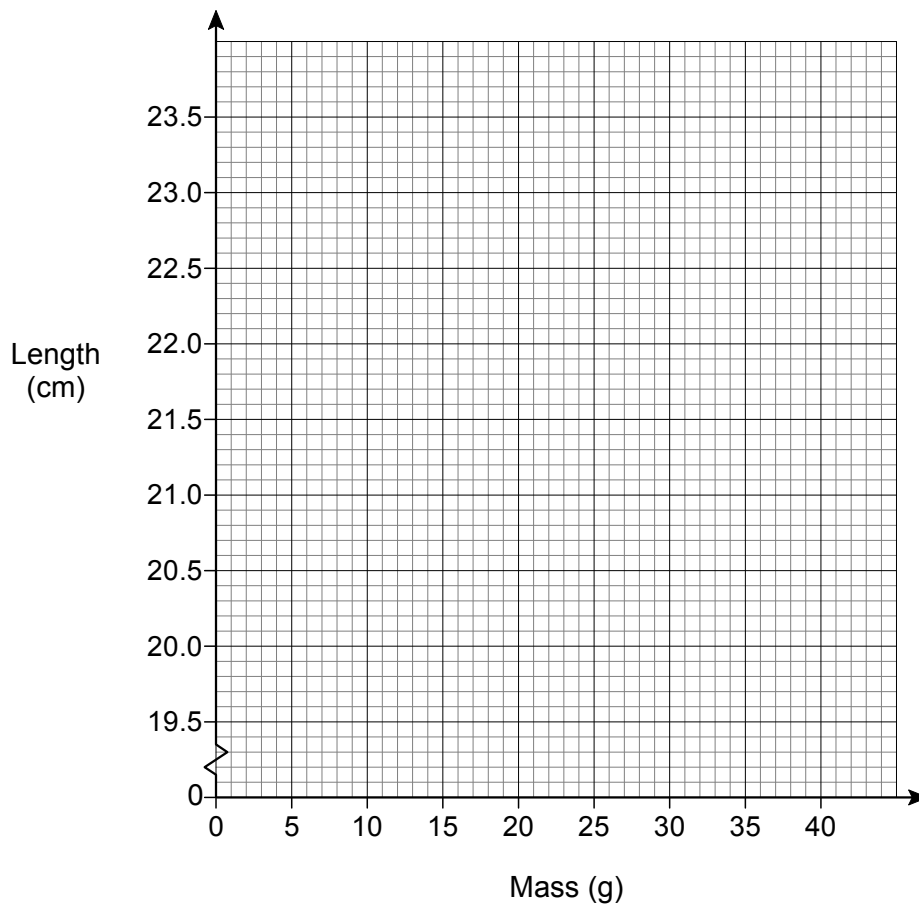


The length of the spring is measured for each mass.

<b>Mass (g)</b>	10	20	30	40
<b>Length (cm)</b>	20.8	21.6	22.4	23.2

**10 (a)** Draw a graph to show the length of the spring for masses from 10 g to 40 g

**[2 marks]**





**10 (b)** Estimate the length of the spring with no mass hung on it.

**[1 mark]**

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

**10 (c)** How much longer is the spring with a 35 g mass than with a 15 g mass?

**[2 marks]**

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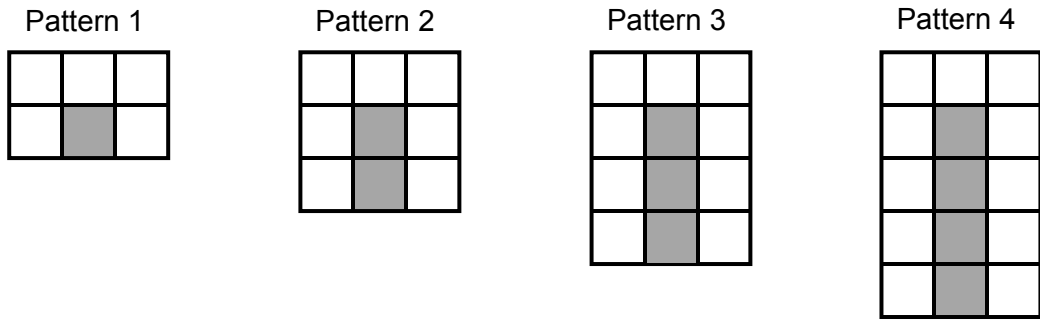
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Answer \_\_\_\_\_ cm

**Turn over for the next question**

**11** A sequence of patterns uses grey squares and white squares.  
Here are the first four patterns.



**11 (a)** Work out the **total** number of squares in Pattern 100

**[3 marks]**

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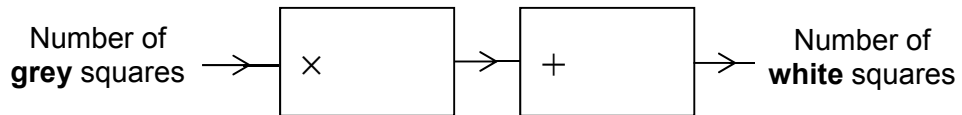


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Answer \_\_\_\_\_

11 (b) Complete this number machine for the sequence of patterns.

[1 mark]



Turn over for the next question

12 In Scotland, squirrels are red or grey in the ratio red : grey =  $1 : 2\frac{1}{2}$

12 (a) What fraction of the squirrels in Scotland are red?

[2 marks]

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Answer \_\_\_\_\_

12 (b) In Scotland there are 120 000 red squirrels.

How many squirrels are there altogether in Scotland?

[2 marks]

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Answer \_\_\_\_\_

**13** Hayley and Tom have £2000 to spend on food at their wedding.  
Here are their two options.

**Wonderful Weddings!**

Normal price            £32 per person

**Special offer**

10% off

<b>Kim the Caterer</b>	
<b>Number of people</b>	<b>Price per person</b>
100 & over	£24.50
80 to 99	£26.50
60 to 79	£28.50
up to 59	£30.50

Work out the **maximum** number of people they can pay for.  
Show working to compare the maximum number of people for **both** options.

**[5 marks]**

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Answer \_\_\_\_\_

14 Solve  $4(x + 5) = 15$

[3 marks]

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$x =$  \_\_\_\_\_

15 The mass of  $40 \text{ cm}^3$  of copper is 356 grams.  
Work out the mass of  $90 \text{ cm}^3$  of copper.

[2 marks]

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Answer \_\_\_\_\_ grams

**16** 24 boys, 45 girls and 281 adults are the members of a badminton club.  
50 more children join the club.  
The number of girls is **now** 18% of the total number of members.

How many of the 50 children were **boys**?

**[4 marks]**

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Answer \_\_\_\_\_

**Turn over for the next question**

17 The table shows information about the marks of 30 students in a test.

Mark	Frequency
14	2
15	10
16	2
17	3
18	13
Total = 30	

Students who scored less than the mean mark have to retake the test.

How many students have to retake the test?

You **must** show your working.

**[3 marks]**

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Answer \_\_\_\_\_



**18** Work out the square root of 100 million.  
Circle your answer.

[1 mark]

1000

10 000

100 000

1 000 000

**19**  $\mathbf{a} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$  and  $\mathbf{b} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$

Circle the vector  $\mathbf{a} - \mathbf{b}$

[1 mark]

$\begin{pmatrix} -3 \\ -5 \end{pmatrix}$

$\begin{pmatrix} 7 \\ 1 \end{pmatrix}$

$\begin{pmatrix} 3 \\ 1 \end{pmatrix}$

$\begin{pmatrix} 7 \\ -5 \end{pmatrix}$

**20** Circle the decimal that is closest in value to  $\frac{2}{3}$

[1 mark]

0.6

0.66

0.667

0.67

**Turn over for the next question**

21 When  $x^2 = 16$  the **only** value that  $x$  can be is 4

Is this true or false?

Tick a box.

[1 mark]

True  False

Reason \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

22 In 1999 the minimum wage for adults was £3.60 per hour.

In 2013 it was £6.31 per hour.

Work out the percentage increase in the minimum wage.

[3 marks]

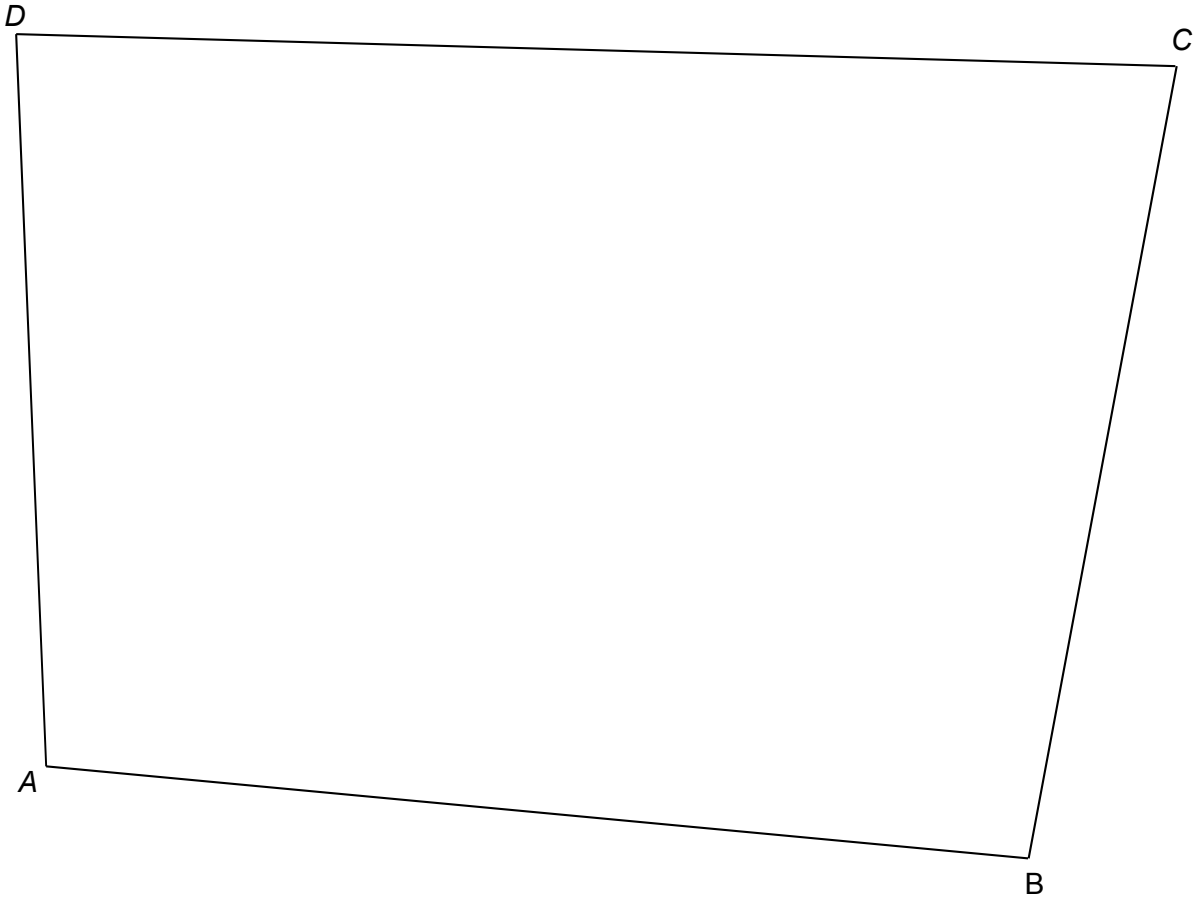
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Answer \_\_\_\_\_ %

**23** Use ruler and compasses to answer this question.

Point  $P$  is

- the same distance from  $AB$  and  $AD$
- 6 cm from  $C$ .



Show the position of  $P$  on the diagram.

**[3 marks]**

**Turn over for the next question**

**24 (a)** Use your calculator to work out  $19.42^2 - \sqrt[3]{1006} \div 4.95$

Write down your full calculator display.

**[1 mark]**

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Answer \_\_\_\_\_

**24 (b)** Use approximations to check that your answer to part (a) is sensible.  
You **must** show your working.

**[2 marks]**

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**25** Three cups, A, B and C, contain only salt and water.  
The different mixtures are

**A** salt : water = 3 : 22

**B** salt =  $\frac{1}{8}$

**C** salt = 12.75%

Which cup has the greatest proportion of salt?

You **must** show your working.

**[3 marks]**

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Answer \_\_\_\_\_

**Turn over for the next question**

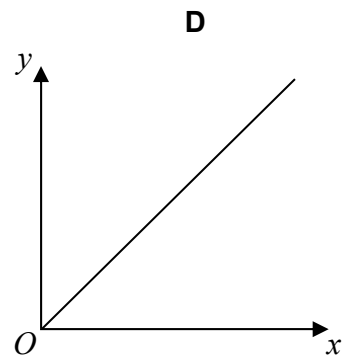
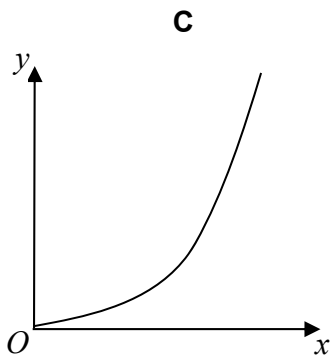
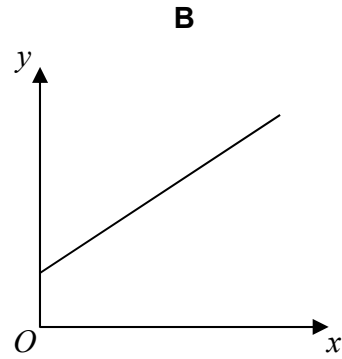
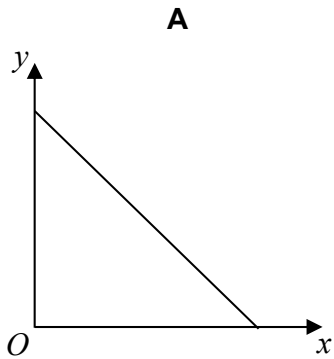
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$y$  is directly proportional to  $x$ .

Which graph shows this?

Circle the correct letter.

[1 mark]



**27** A bag contains counters that are red, blue, green or yellow.

	red	blue	green	yellow
Number of counters	9	$3x$	$x - 5$	$2x$

A counter is chosen at random.

The probability it is **red** is  $\frac{9}{100}$

Work out the probability it is green.

**[4 marks]**

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Answer \_\_\_\_\_

**Turn over for the next question**

**28** The pressure at sea level is 101 325 Pascals.

Any rise of 1 km above sea level decreases the pressure by 14%

For example,

at 3 km above sea level the pressure is 14% less than at 2 km

Work out the pressure at 4 km above sea level.

Give your answer to 2 significant figures.

**[4 marks]**

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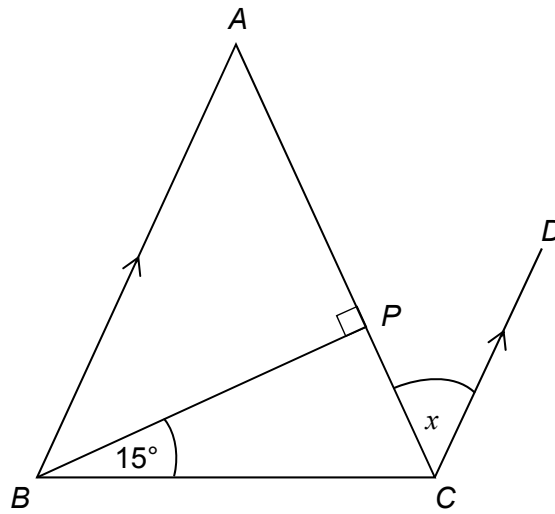
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Answer \_\_\_\_\_ Pascals



- 29  $ABC$  is a triangle with  $AB = AC$   
 $BA$  is parallel to  $CD$ .

Not drawn accurately



Show that angle  $x = 30^\circ$

[3 marks]

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**END OF QUESTIONS**

**There are no questions printed on this page**

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ANSWER IN THE SPACES PROVIDED**