

1. Complete the following estimates by writing a suitable metric unit on each of the dotted lines.

- (a) The length of a small car is about 400 .....
- (b) The weight of a new pencil is about 4 .....
- (c) The volume of a coffee cup is about 200 .....

2. Ryan buys 8 postage stamps.  
The stamps cost £0.60 each.  
He pays with a £10 note.

Work out how much change Ryan should receive.

3. The secretary in a school office posted 90 letters on one day.  
The pictogram shows information about the cost of postage for each of these letters except those costing 69 pence.

50 pence	
60 pence	
69 pence	
90 pence	
110 pence	

There were 40 letters that cost 50 pence each to post.

(a) Find the number of letters that cost 110 pence each to post.

(b) Find the number of letters that cost 60 pence each to post.

There were 17 letters that cost 69 pence each to post.

- (c) Show this information on the pictogram.
- (d) Write down the mode of the cost of postage.

4. Here are the first five terms of a number sequence.

13      20      27      34      41

(a) Write down the next two terms of the sequence.

(b) Explain how you worked out your answer.

(c) Find the  $n$ th term of this sequence

(d) Find the 100<sup>th</sup> term

5. Here are the first five terms of a number sequence.

3      6      12      24      48

(a) Write down the next two terms of the sequence.

(b) Explain how you worked out your answer.

6. Here are the first five terms of a number sequence.

1      1      2      3      5      8

(a) Write down the next two terms of the sequence.

(b) Explain how you worked out your answer.

(c) Work out the 20th term of the sequence.

7. The diameter of Jupiter is 142 796 kilometres.

(a) Write the number 142 796 correct to the nearest thousand.

Jupiter takes 11.862 earth years to orbit the sun.

(b) Write the number 11.862 correct to 1 decimal place.

Jupiter is 778.3 million kilometres from the sun

(c) Write the number 778.3 correct to 3 significant figures.

8. Here are four discs.  
Each disc has a number on it.



These four discs are arranged to make the number 7235.

(a) Arrange the four discs to make an even number.



(b) Arrange the four discs to make the smallest possible number.



(c) Arrange two of the discs to make a square number.



(d) Arrange two of the discs to make a cube number.



9. This formula can be used to work out the value, in pounds (£), of a number of shares in a water company.

$$\text{Value of shares} = 2.5 \times \text{number of shares}$$

(a) Work out the value of 400 shares.

The value of Elisha's shares in the water company is £875.

(b) Work out the number of shares that Elisha has.

The value of  $n$  shares in the water company is £ $V$ .

(c) Write down a formula for  $V$  in terms of  $n$ .

**10.** Rohan plays for his village cricket team.  
Here are the number of runs he scored in each of six games.

12      4      35      67      32      54

(a) Find the range of the number of runs Rohan scored.

(b) Find the mean of the number of runs Rohan scored.

One of the six games is picked at random.

(c) Find the probability that Rohan scored more than 50 runs in this game.

**11.**

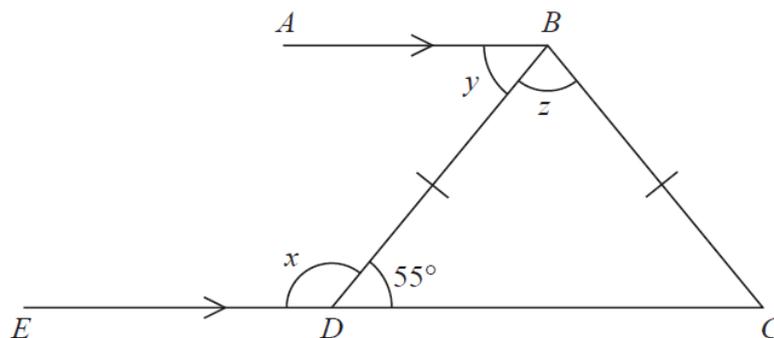


Diagram **NOT** accurately drawn

$AB$  and  $EDC$  are parallel lines.

$BD = BC$

Angle  $BDC = 55^\circ$

(a) (i) Work out the size of angle  $x$ .

(ii) Give a reason for your answer.

(b) Find the size of angle  $y$ . (c) Work out the size of angle  $z$ .

**12.**

1 euro = 120 yen
£1 = 1.2 euros

(a) Change 250 euros to yen.

(b) Change 9000 yen to euros.

(c) Change £50 to yen.

**13.** (a) Work out the value of  $2.5^3$

(b) Work out the value of  $\frac{451.4}{14.1+10.3}$

(c) Work out the value of  $\sqrt{7.8^2 - 7.2^2}$

**14.** (a) Solve  $3x + 5 = 26$   
Show clear algebraic working.

(b) Solve  $4(5y - 1) = 3(6y + 7)$   
Show clear algebraic working.

15. The diagram shows a shape with one line of symmetry.

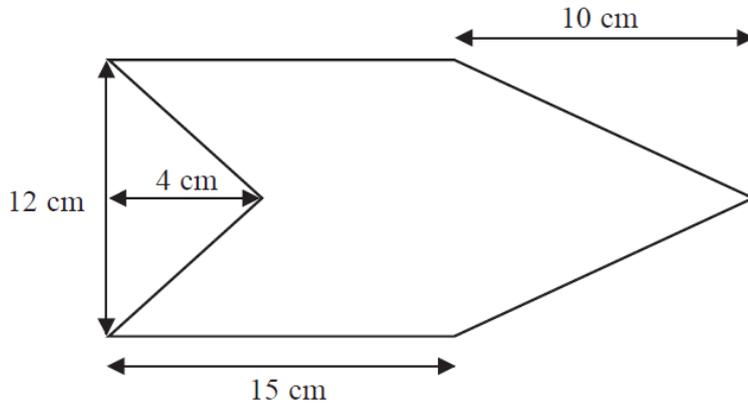


Diagram **NOT** accurately drawn

Work out the area of the shape.

16. Find the sum of the interior angles of a polygon with 7 sides.

17.

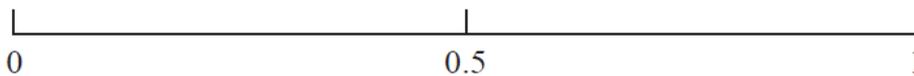
impossible	unlikely	likely	certain
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- (a) Write down a word from the box that best describes the likelihood of each outcome.

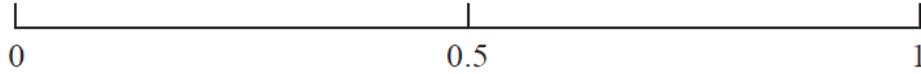
- (i) In a week chosen at random, Wednesday will be after Tuesday.  
(ii) A person chosen at random will have a birthday in August.

- (b) James throws an ordinary fair dice.

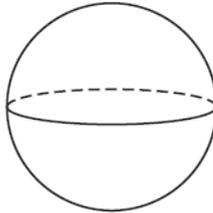
- (i) On the probability scale, mark with a cross (×) the probability that the dice will land on a number greater than 6.



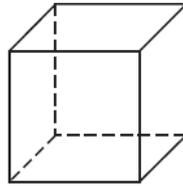
- (ii) On the probability scale, mark with a cross (×) the probability that the dice will land on an even number.



18. (a) Write down the mathematical name of this 3-D shape.



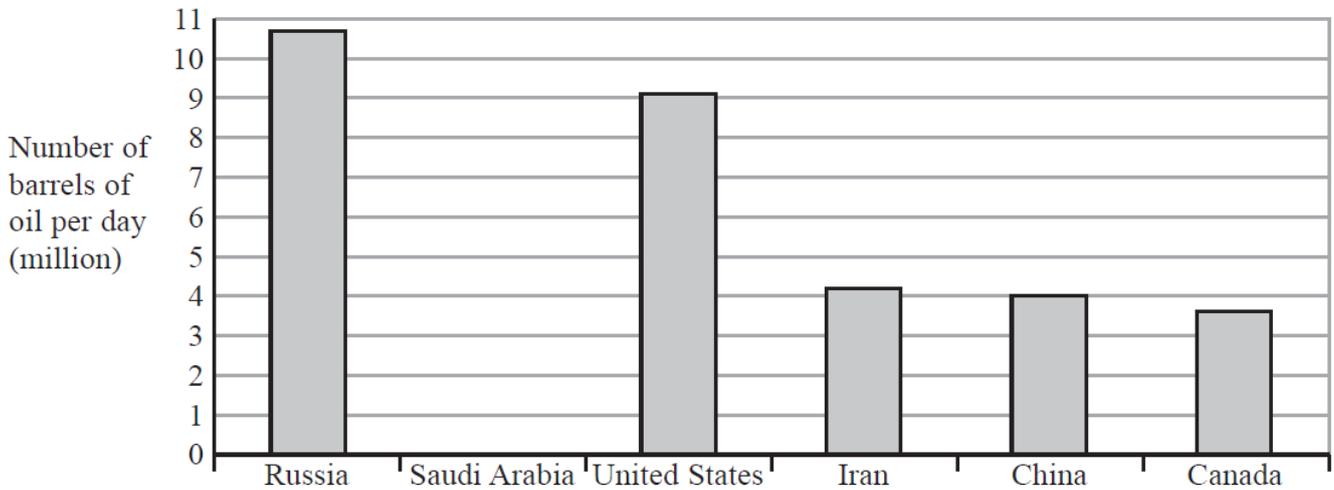
(b) (i) Write down the mathematical name of this 3-D shape.



(ii) How many faces does this shape have?

(iii) How many vertices does this shape have?

19. The bar chart shows information about the number of barrels of oil produced per day in each of five countries.



(a) Write down the number of barrels of oil produced per day in China.

(b) Write down the number of barrels of oil produced per day in Russia.

(c) Which country produces 4.2 million barrels of oil per day?

Saudi Arabia produces 9.6 million barrels of oil per day.

(d) Draw a bar on the bar chart to show this information.

In the United States

72 000 barrels of oil are produced per day in the state of Utah.  
 18 000 barrels of oil are produced per day in the state of Michigan.

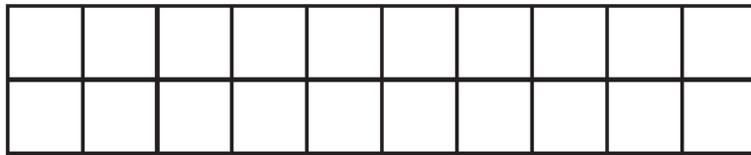
- (e) Find the ratio of the number of barrels of oil produced in Utah to the number of barrels of oil produced in Michigan.  
 Give your ratio in its simplest form.

20. (a) Write these numbers in order of size.  
 Start with the smallest number

5.6      5.04      4.6      4.56      5.46

- (b) Write  $7\frac{1}{2}$  as a decimal number.

- (c) Shade 30% of this shape.

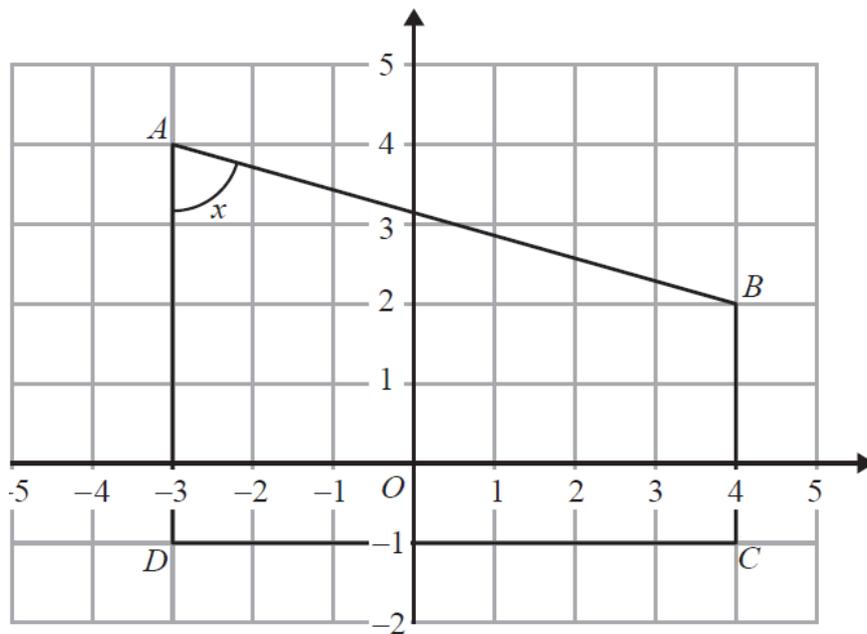


- (d) Write 40% as a decimal.

- (e) Write 0.87 as a fraction.

- (f) Write  $\frac{9}{16}$  as a decimal.

21. The diagram shows a quadrilateral  $ABCD$  on a grid.



- (a) Write down the coordinates of the point

- (i)  $B$   
(ii)  $D$   
(b) Write down the mathematical name for the quadrilateral  $ABCD$ .

(c) (i) Write down the mathematical name for the angle marked  $x$ .

(ii) Measure the size of the angle marked  $x$ .

**22** (a) Solve  $5x = 20$

(b) Simplify  $k + k + k + k + k$

(c) Simplify  $8p + 4m - 5p + m$

(d)  $T = 4x + 9y$

Work out the value of  $T$  when  $x = -5$  and  $y = 3$

(e) Factorise  $c^2 - 5c$

(f) Simplify  $d^5 \times d^7$

- 23.** (a) On the rectangle, draw all the lines of symmetry.



- (b) Here are four quadrilaterals.



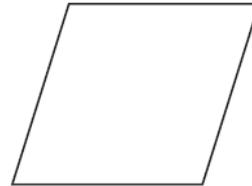
**A**



**B**



**C**



**D**

- (i) One of these quadrilaterals has rotational symmetry of order 4.  
Write down the letter of this quadrilateral.
- (ii) One of these quadrilaterals has no lines of symmetry and rotational symmetry of order 2.  
Write down the letter of this quadrilateral.

**24.** Becky counted the number of matches in each of 50 boxes.  
The table shows information about her results.

<b>Number of matches</b>	<b>Frequency</b>
45	3
46	7
47	12
48	23
49	4
50	1

- (a) Write down the mode of the number of matches.
- (b) Work out the range of the number of matches.
- (c) Work out the mean number of matches.
- (d) Work out the median number of matches.

25.

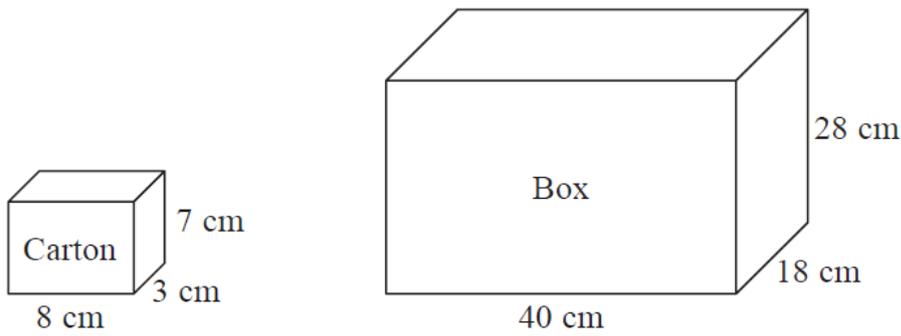


Diagram **NOT** accurately drawn

A carton measures 8 cm by 3 cm by 7 cm.  
Cartons are packed into boxes.  
A box measures 40 cm by 18 cm by 28 cm.

Work out the number of cartons that can completely fill one box.

26. A bag contains only red counters, blue counters and yellow counters.  
The number of red counters in the bag is the same as the number of blue counters.

Mikhail takes at random a counter from the bag.  
The probability that the counter is yellow is 0.3.

Work out the probability that the counter Mikhail takes is red.

27.

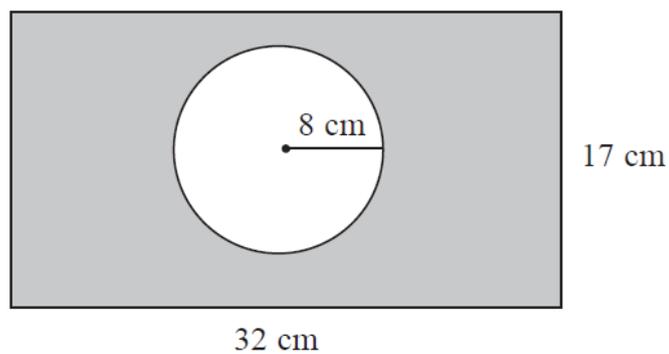
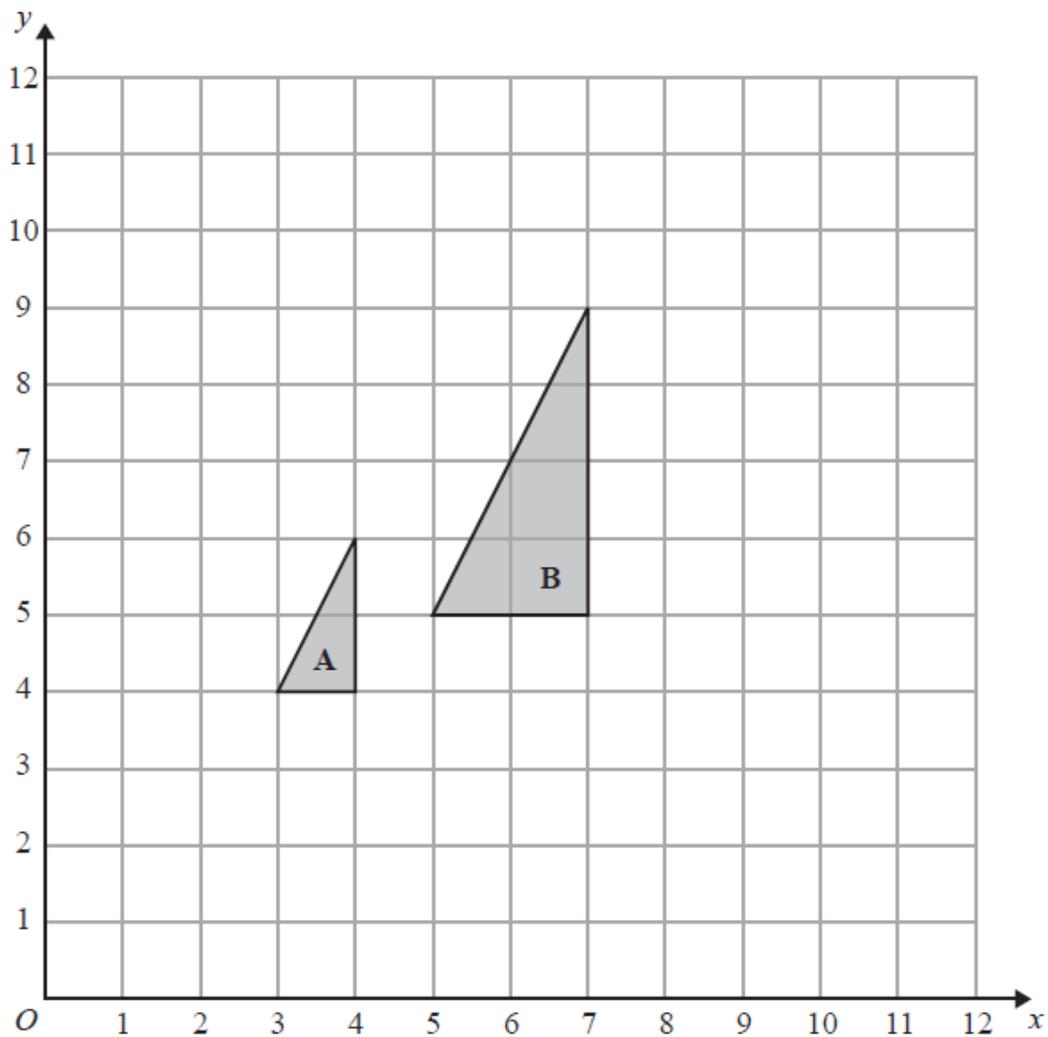


Diagram **NOT** accurately drawn

The diagram shows a circle inside a rectangle.

Work out the area of the shaded region.  
Give your answer correct to 3 significant figures.

28.

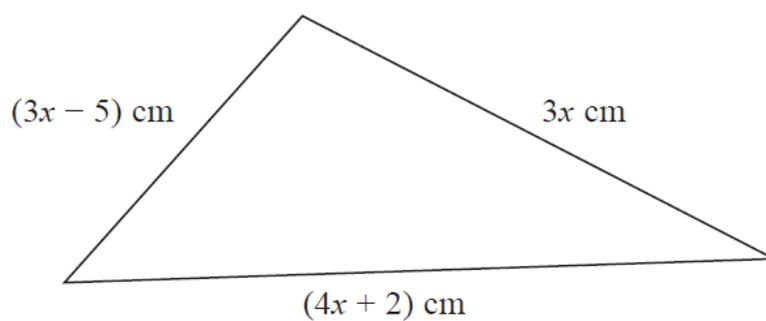


(a) Describe fully the single transformation that maps triangle **A** onto triangle **B**.

(b) On the grid, translate triangle **A** 5 squares to the right and 2 squares down.

29. The diagram shows a triangle.

Diagram **NOT** accurately drawn



The lengths of the sides of the triangle are  $3x$  cm,  $(3x - 5)$  cm and  $(4x + 2)$  cm.

The perimeter of the triangle is 62 cm.

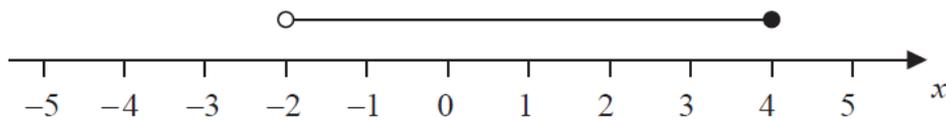
Work out the value of  $x$ .

Show clear algebraic working.

30. Three positive whole numbers are all different.  
The numbers have a median of 8 and a mean of 6.  
Find the three numbers.

31. (a) Solve the inequality  $3x + 8 < 35$

(b) Write down the inequality shown on the number line.



32. A jar contains 72 coloured beads.  
There are 24 red beads, 28 blue beads and 20 green beads.

Ajit takes at random a bead from the jar.

(a) Find the probability that the bead Ajit takes is

(i) red,

(ii) blue or green.

A second jar contains coloured beads.  
Ajit takes at random a bead from the jar.  
The probability that the bead is yellow is 0.08.  
The probability that the bead is pink is 0.1.

(b) Find the probability that the bead is neither yellow nor pink.

A third jar contains 100 coloured beads.  
20 of these beads are brown.

Ajit takes at random a bead from the jar.  
He records the colour of the bead and then returns the bead to the jar.  
He does this 60 times.

(c) Work out an estimate for the number of times Ajit records a brown bead.

- 33.** Eloy's height was 125 cm when his age was 7 years.  
His height was 153 cm when his age was 12 years.

(a) Work out the percentage increase in Eloy's height between the ages of 7 and 12 years.

Eloy's height at the age of 12 years was 85% of his height at the age of 20 years.

(b) Work out Eloy's height when his age was 20 years.

- 34.** (a) Expand and simplify  $3(2c - 5) - 2(c - 4)$

(b) Simplify  $(4e^3)^2$

(c) Expand and simplify  $(a + 5)(a - 1)$

(d) Solve  $(a + 8)(a - 2) = 0$

(e) solve  $a^2 + 6a + 5 = 0$

35. Use a calculator to work out

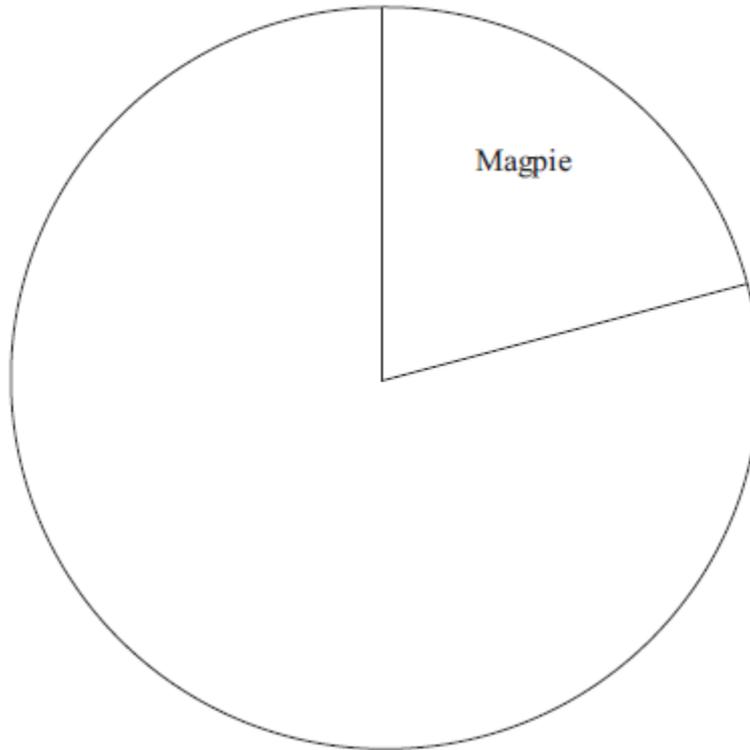
$$\frac{\sqrt{20.4}}{6.2 \times 0.48}$$

Write down all the figures on your calculator display.  
Give your answer as a decimal.

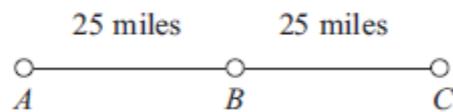
36. The table gives some information about the birds Paula sees in her garden one day.

<b>Bird</b>	<b>Frequency</b>
Magpie	15
Thrush	10
Starling	20
Sparrow	27

Complete the accurate pie chart.



37.



$A$ ,  $B$  and  $C$  are 3 service stations on a motorway.

$AB = 25$  miles

$BC = 25$  miles

Aysha drives along the motorway from  $A$  to  $C$ .

Aysha drives at an average speed of 50 mph from  $A$  to  $B$ .

She drives at an average speed of 60 mph from  $B$  to  $C$ .

Work out the difference in the time Aysha takes to drive from  $A$  to  $B$  and the time Aysha takes to drive from  $B$  to  $C$ .

Give your answer in minutes.

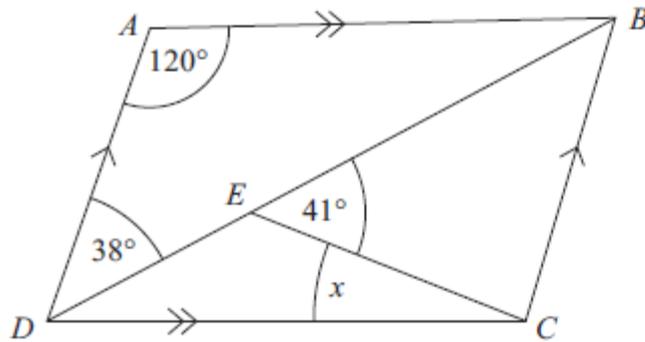


Diagram **NOT**  
accurately drawn

$ABCD$  is a parallelogram.

Angle  $ADB = 38^\circ$ .

Angle  $BEC = 41^\circ$ .

Angle  $DAB = 120^\circ$ .

Calculate the size of angle  $x$ .

You must give reasons for your answer.

39. The diagram shows a solid triangular prism.

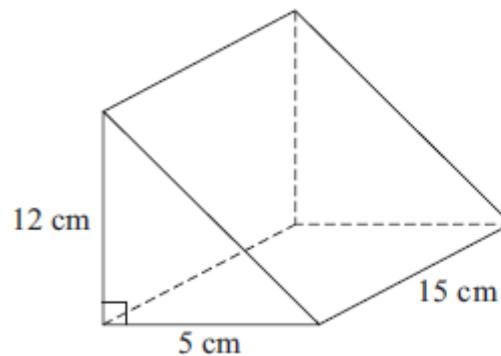


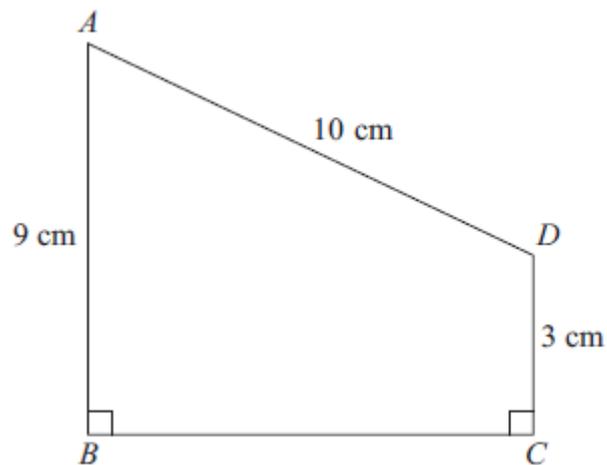
Diagram **NOT**  
accurately drawn

The prism is made from metal.

The density of the metal is  $6.6\text{ grams per cm}^3$ .

Calculate the mass of the prism.

40.  $ABCD$  is a trapezium.



$AD = 10$  cm  
 $AB = 9$  cm  
 $DC = 3$  cm  
Angle  $ABC =$  angle  $BCD = 90^\circ$

Calculate the length of  $AC$ .  
Give your answer correct to 3 significant figures.

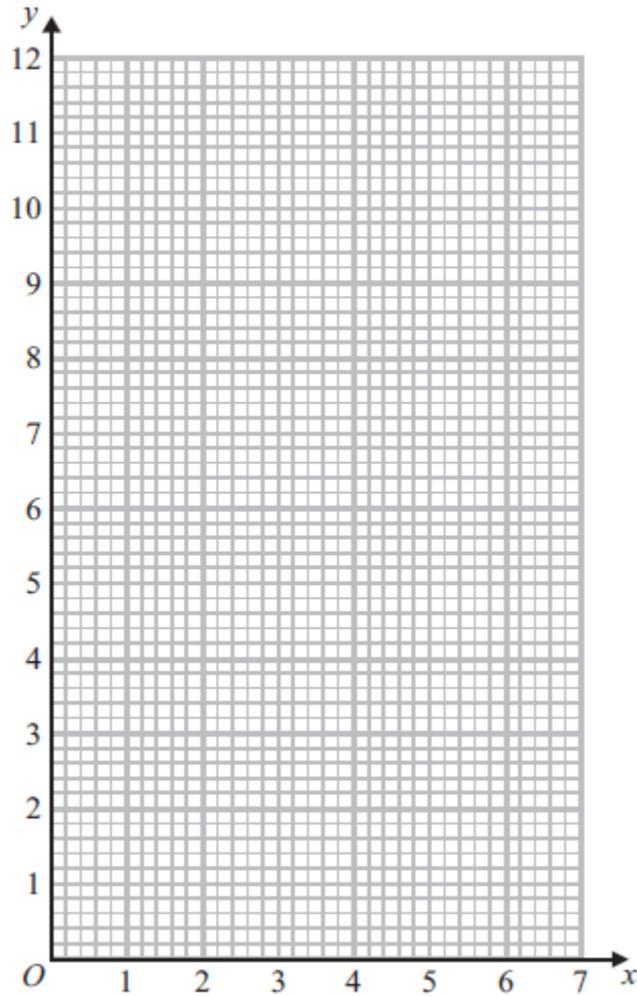
- 41 Bill's weight decreases from 64.8 kg to 59.3 kg.

Calculate the percentage decrease in Bill's weight.  
Give your answer correct to 3 significant figures.

42. (a) Complete the table of values for  $y = \frac{6}{x}$

$x$	0.5	1	2	3	4	5	6
$y$		6	3		1.5		1

(2)

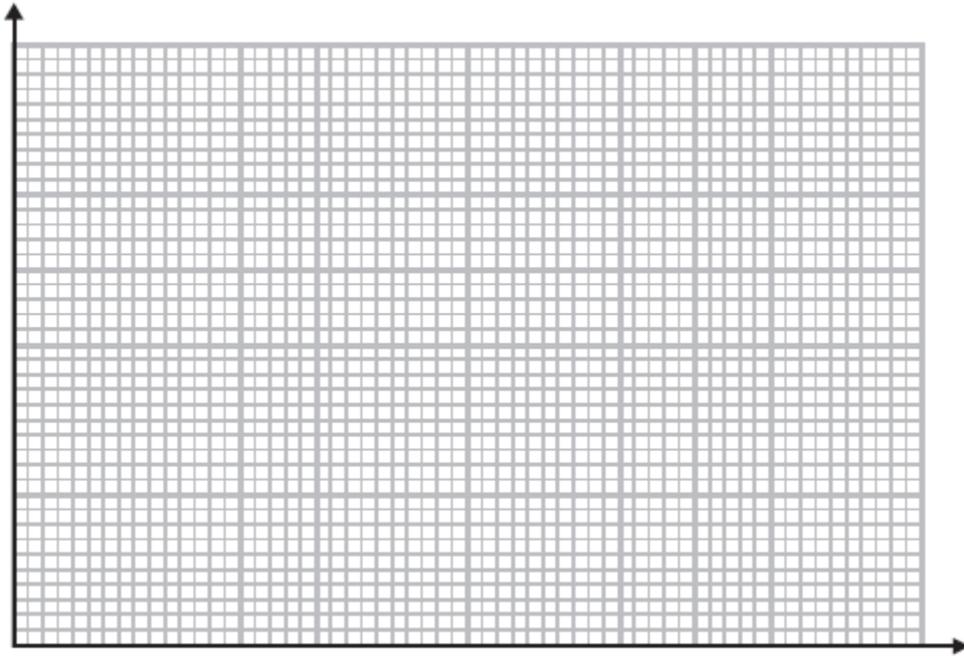


(b) On the grid, draw the graph of  $y = \frac{6}{x}$  for  $0.5 \leq x \leq 6$

43. The table gives information about the heights,  $h$  metres, of trees in a wood.

Height ( $h$ metres)	Frequency
$0 < h \leq 2$	7
$2 < h \leq 4$	14
$4 < h \leq 8$	18
$8 < h \leq 16$	24
$16 < h \leq 20$	10

Draw a frequency polygon to show this information.



44. Sketch for 0-360

a)  $y = \sin x$

b)  $y = \cos x$

45. M is measured to be 5.7. Write the error interval for M

46. Complete a table of values between  $x = -2$  to  $x = 4$  for  $y = x^2 - 3x - 1$

47. 12 men take 8 days to do a job. How long will it take 4 men?

48. Work out  $6 - 3 \times 4$