NAME

Non-calculator

1 Work out $(-3)^2 - 1$

.....

(1 mark)

2 Work out $\dfrac{5^3}{5 \times 5 \times 5 \times 5}$

.....

(1 mark)

3 Is 7 or 8 the best estimate of $\sqrt{50}$?

Explain why.

.....

.....

(1 mark)

4 Freddie works out $(4^3)^2$

He writes the answer 4^5

a What calculation error did Freddie make to get the incorrect answer of 4^5?

.....

.....

(1 mark)

b What is the correct answer?

.....

(1 mark)

5 What is the missing power in this calculation?

$10 = \frac{1}{100}$

.....

(1 mark)

6 Work out 50×10^{-3}

a Give your answer as a decimal.

.....

(1 mark)

b Write your answer in standard form.

.....

(1 mark)

7 Round each number in this calculation to 1 significant figure.

Then estimate the answer.

$29.32 \div 5.94$

.....

(2 marks)

8 A new path is 7.9 m long and 0.95 m wide.

Jason wants to cover the path with pebbles.

The pebbles for the path cost £28.95 per m^2.

a Estimate the cost of the pebbles.

£.....

(2 marks)

b Will your estimate be more or less than the actual cost of the pebbles?

Explain why.

.....

.....

(1 mark)

9 Work out $[6 + 12 \div (10 - 4)]^2$

.....

(2 marks)

10 Write down the value of 8^0

.....

(1 mark)

11 Estimate the answer to this calculation.

$$\frac{\sqrt{2.3 \times 8.12}}{1.8^2}$$

.....

(2 marks)

12 Write 27^6 as a single power of 3

.....

(2 marks)

13 What is the missing power in this calculation?

$2^6 \div 2 \quad \times 2 = 2^3$

.....

(1 mark)

Calculator

14 Anna works out $10^{60} \div 10^{6}$

She writes the answer 10^{10}

a What calculation error did Anna make to get the incorrect answer of 10^{10}?

(1 mark)

b What is the correct answer?

.....

(1 mark)

15 Show that these calculations give the same answer.

$[(4 - 5) \times 3]^2$ $(4 - 5)^2 \times 3^2$

(2 marks)

16 Carol squares a positive fraction with denominator 10

Her answer is 0.09

What fraction did Carol square?

.....

(2 marks)

17 Use your calculator to work out 59 250 000 × 23 400

Give your answer in standard form to 3 s.f.

.....

(1 mark)

18 The table shows the approximate populations of four of the world's continents.

Write the continents in order of population size from smallest to largest.

Continent	Population
Europe	7.4×10^8
Africa	1.2×10^9
Asia	4.58×10^9
North America	5.79×10^8

.....

(2 marks)

Overall mark	**/30**

NAME

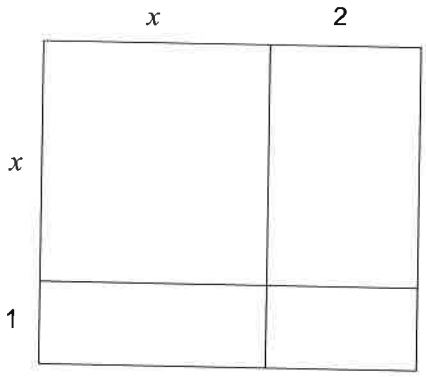
Non-calculator

1 Solve $9x = 4$

.....

(1 mark)

2 Write and simplify an expression for the area of the whole rectangle.



.....

(2 marks)

3 Expand $a(a + 1)$

.....

(2 marks)

4 Work out the value of $5k^2$ when $k = 3$

.....

(1 mark)

5 Which of these expressions has the larger value when $x = 4$?

$(x - 1)^2$ or $x^2 - 1$

Show your working clearly.

.....

(2 marks)

6 Dean buys some mugs. Each mug costs £7

Write a formula for the cost, £C, of n mugs.

$C =$.....

(1 mark)

7 A formula used in physics is

$E = P + K$

a Work out the value of E when $P = -85$ and $K = 76$

$E =$ .....

(1 mark)

b Work out the value of P when $E = 58$ and $K = 19$

$P =$ .....

(1 mark)

c Make K the subject of the formula.

.....

(1 mark)

8 Solve $3p + 1 = 2p - 7$

$p =$ .....

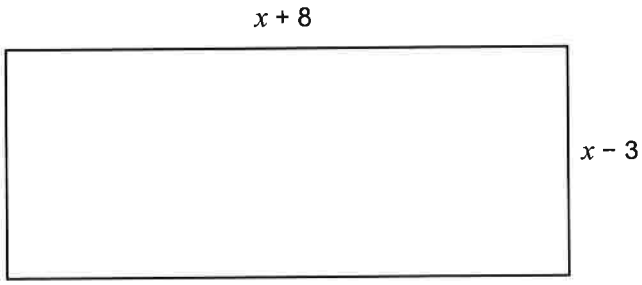
(2 marks)

9 Work out the value of $2t^3 - t$ when $t = 2$

.....

(2 marks)

10 Write and simplify an expression for the area of the rectangle.



.....

(2 marks)

11 Simplify $\frac{6p^2 \times 4p^5}{8p^4}$

.....

(2 marks)

Calculator

12 a Cupcakes cost 60p each.

Boxes cost 40p each.

Write a formula for the cost, C pence, of n cupcakes and one box.

.....

(2 marks)

b The cost of n cupcakes and two boxes is £7.40

Find the value of n.

.....

(2 marks)

13 To repair a computer, an IT expert charges £35 basic fee and then £1.40 per minute.

The total charge is £R for a repair taking x minutes.

a Write a formula for R in terms of x.

.....

(1 mark)

b Work out the cost of a repair that takes 45 minutes.

£.....

(2 marks)

14 Use the formula $F = ma$ to calculate F when $m = 24$ and $a = 9.8$

.....

(1 mark)

15 Use the formula $v^2 - u^2 = 2as$ to work out the value of a when

$v = 13$, $u = 2$, $s = 100$

$a =$.....

(2 marks)

Overall mark	**/30**

NAME

Non-calculator

1 The back-to-back stem and leaf diagram shows the maths test results for two classes.

Class 1							Class 2							
				5	0	8	9							
	6	5	4	3	3	1	1	2	5	6				
8	7	7	5	3	1	2	0	1	1	2	4	5	5	6
	6	6	6	3	0	3	1	3	3	4	4	4		

Key: 3|1 means 13

Key: 1|2 means 12

Which class has the greater range of marks?

You must show all your working.

.....

(2 marks)

2 Luke wants to find out people's views on camping. He has two possible questions:

A Do you agree that camping is fun? Yes ☐ No ☐

B Do you like camping? Yes ☐ No ☐

Which question should Luke use? Give a reason for your answer.

.....

.....

(1 mark)

3 A head teacher wants to find out whether students prefer to start the school day at 8.30 am or 9 am.

She will take a random sample from all the students. There are 1000 students in total.

Which sample size should the head teacher choose?

A 10 students

B 100 students

C 500 students

Give reasons for this choice and why the other sample sizes are not suitable choices.

.....

.....

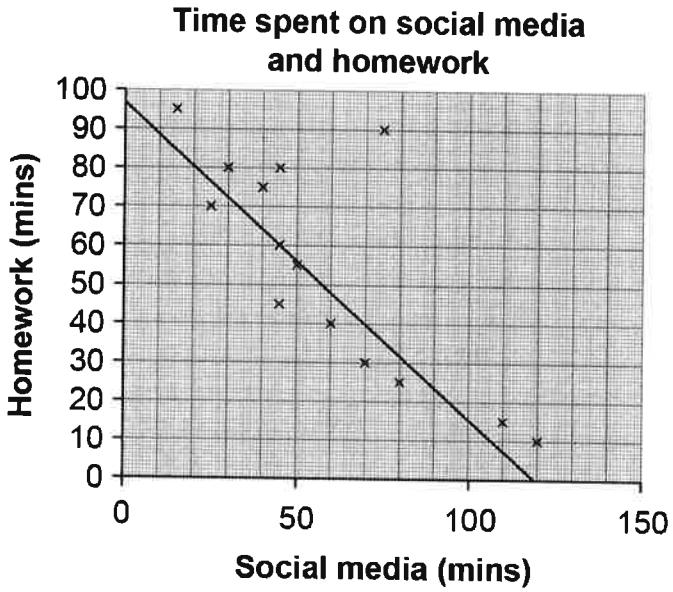
.....

.....

(2 marks)

4 A student records the number of minutes he spends on social media and the number of minutes he spends on homework each day for 14 days.

The scatter graph shows the results.



a Circle the outlier on the graph.

(1 mark)

b Describe the correlation shown on the graph.

.....

(1 mark)

c The next day the student spent 90 minutes on social media.

Estimate the number of minutes she spent on homework that day.

..... minutes

(1 mark)

5 Sixteen children in Class A sat a maths test. Here are their results.

32	24	9	16	24	18	7	30
9	22	37	9	31	20	15	28

a Complete the ordered stem and leaf diagram to show these results.

0	
1	
2	
3	

Key:

(3 marks)

b Find the mode.

.....

(1 mark)

c Find the median.

.....

(1 mark)

d Find the range.

.....

(1 mark)

Twenty children in Class B sat the same maths test. Here are the mode, median and range for their results.

Mode	25
Median	26
Range	31

e Compare the results for the two classes.

.....

.....

.....

.....

(2 marks)

6 Leila measures the lengths of worms, in centimetres. Here are her results:

6.1 4.5 7.6 3.8 9.1 7.2 8.0

4.8 5.2 10.3 6.4 10.8 9.7 9.9

a Complete the grouped frequency table to record this data.

Length, (L cm)	**Frequency**
$3 \leq L < 5$	
$5 \leq L < 7$	
$7 \leq L < 9$	
$9 \leq L < 11$	

(2 marks)

b What is the modal class?

.....

(1 mark)

c Write down the class interval that has the median length.

.....

(1 mark)

7 Malek wants to select a random sample of 6 students from his class.

Which of these will give a random sample?

A The first 6 students on the register

B The first 6 students to arrive one day

C The first 3 boys on the register and the last 3 girls on the register

D Each student puts their name in a box, and 6 are picked out.

Explain the reasons for your choice.

.....

.....

.....

.....

(2 marks)

Calculator

8 People were asked how many TVs they had in their house.

The table shows the results.

Number of TVs	Frequency
0	5
1	6
2	7
3	1
4	1

What is the median number of TVs?

.....

(2 marks)

9 A teacher records the marks scored of 30 students in an English test.

Mark	Frequency
1–5	1
6–10	4
11–15	6
16–20	6
21–25	8
26–30	5

a Write down the modal class.

.....

(1 mark)

b Calculate an estimate of the mean score.

Give your answer to 1 decimal place.

.....

(3 marks)

c The class also do a science test.

The modal class for the science test is 1–5

An estimate for the mean mark for the science test is 12.3

Compare the marks for English and science.

.....

.....

.....

.....

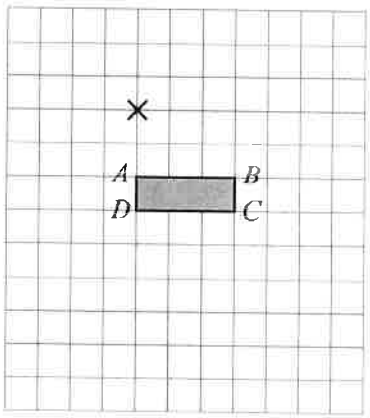
(2 marks)

Overall mark /30

NAME

Non-calculator

1 Rectangle $ABCD$ is going to be enlarged by scale factor 2 and using the centre of enlargement × to give rectangle $A'B'C'D'$.

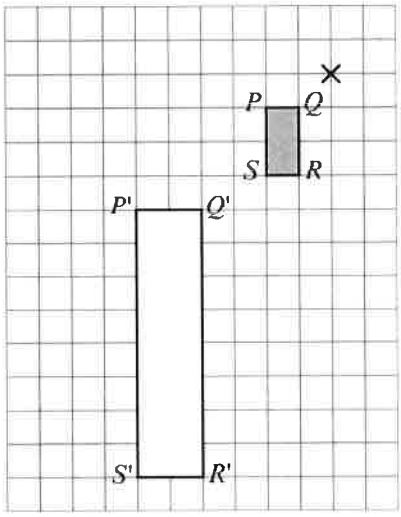


On the grid, mark the point A'.

(1 mark)

2 Rohan wants to enlarge the shaded rectangle $PQRS$ by scale factor 4 using centre of enlargement ×.

He labelled his enlarged rectangle $P'Q'R'S'$.



a Use the scale factor to explain what mistake Rohan has made.

.....

.....

(1 mark)

b Two vertices are in the wrong positions.

Name these two vertices.

..... and .....

(1 mark)

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

A force of 24 N is applied to a surface.

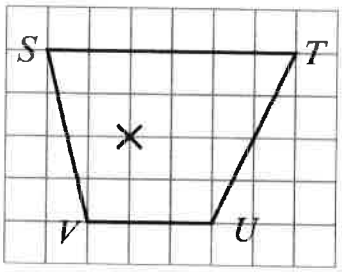
The resulting pressure is 3 N/cm^2.

Work out the area of the surface.

..... cm^2

(1 mark)

4



Trapezium $STUV$ is enlarged by scale factor 3 using the centre of enlargement × to give a trapezium $S'T'U'V'$.

Complete the sentence for the vertex T'.

The vertex T' is ..... squares right and ..... squares up from the centre of enlargement ×.

(2 marks)

5 A garden centre pays £16 for each tree it buys.

The garden centre sells each tree for £20.

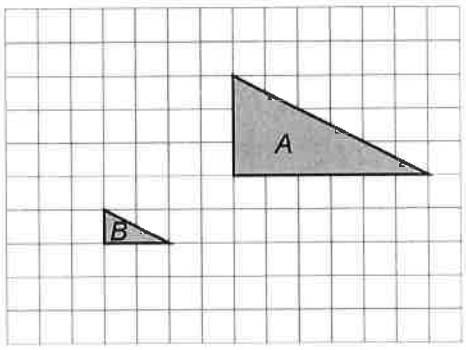
Work out the percentage profit for each tree.

.....%

(2 marks)

6 Linda says, 'Triangle B is an enlargement of triangle A.'

Tim says, 'You cannot have an enlargement that gives a smaller shape.'



a Explain why Tim is wrong.

.....

.....

(1 mark)

b What is the scale factor of the enlargement that maps triangle A onto triangle B?

.....

(1 mark)

7 Last week, Stan walked from his house to his grandmother's house.

Stan walked a distance of 15 km in 3 hours.

a At what average speed did Stan walk?

..... km/h

(1 mark)

b This week, Stan cycles the 15 km to his grandmother's house.

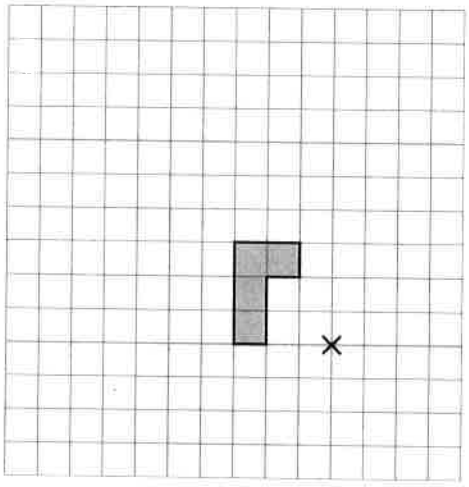
He cycles at an average speed of 20 km/h.

Work out the time, in minutes, that it takes Stan to cycle to his grandmother's house.

.....minutes

(2 marks)

8 Below is a shape and a centre of enlargement, ×.



On the grid, enlarge the shape:

a by scale factor 2, using the marked centre of enlargement

(2 marks)

b by scale factor –1, using the marked centre of enlargement.

(2 marks)

Calculator

9 A box of 50 pens costs £9.50.

A box of 20 of the same pens costs £3.60.

Which box is better value for money?

Show workings to explain your answer.

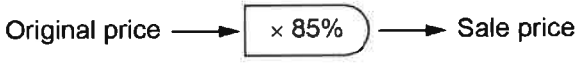
.....

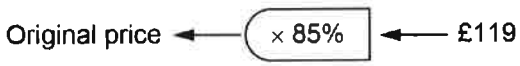
(3 marks)

10 A watch is reduced by 15% in a sale and now costs £119

Mel wants to know the price of the watch before it was in the sale.

a Mel uses inverse operations to find the original price.





What mistake has Mel made in her diagram?

.....

(1 mark)

b Here is the rest of Mel's working:

Sale price = 119 ÷ 85

= £1.40

Write down the calculation Mel should have done.

Use it to find the original price of the watch.

£.....

(2 marks)

11 The same coffee is sold in different bags, containing different weights, for different prices.

The table below gives the weights and prices of the three different sized bags of coffee.

Bag 1	Bag 2	Bag 3
400 g	650 g	270 g
£5	£6.50	£3

By working out the amount of coffee you get for £1, work out the bag that is best value for money.

.....

(3 marks)

12 A gold bar has a volume of 60 cm^3.

Its mass is 1.158 kg.

Calculate the density, in g/cm^3, of the gold bar.

..... g/cm^3

(2 marks)

13 There is a 30% reduction in prices during a sale.

A bed is £245 in the sale.

What was the original price of the bed?

£.....

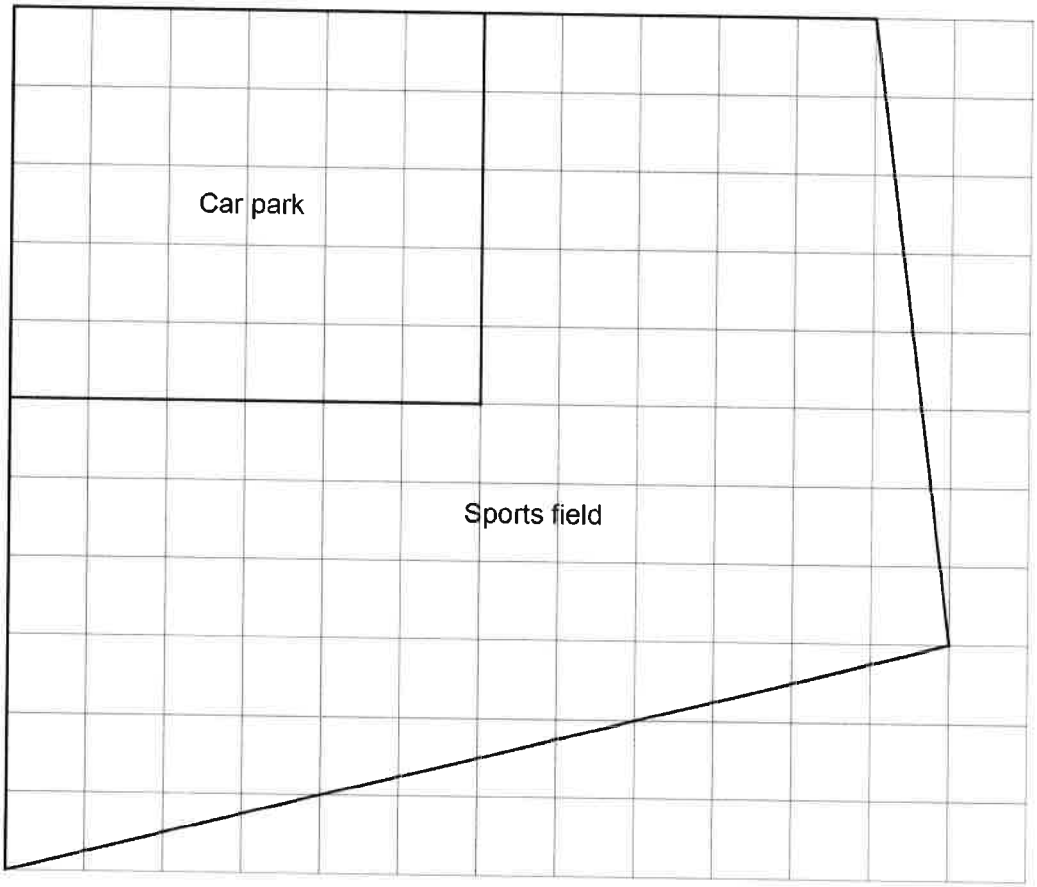
(2 marks)

Overall mark	**/30**

NAME

Non-calculator

1 The scale diagram shows a sports field with a car park.



Scale: The length of 1 square = 10 m

Work out the length and width of the car park in real life.

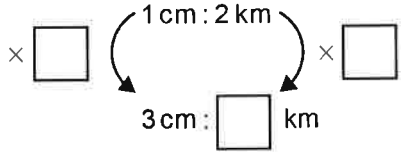
Length = ... m

Width = ... m

(2 marks)

2 A map uses a scale where 1 cm represents 2 km.

a What real-life distance does 3 cm on the map represent?



.....km

(1 mark)

b What distance on the map represents a real-life distance of 14 km?

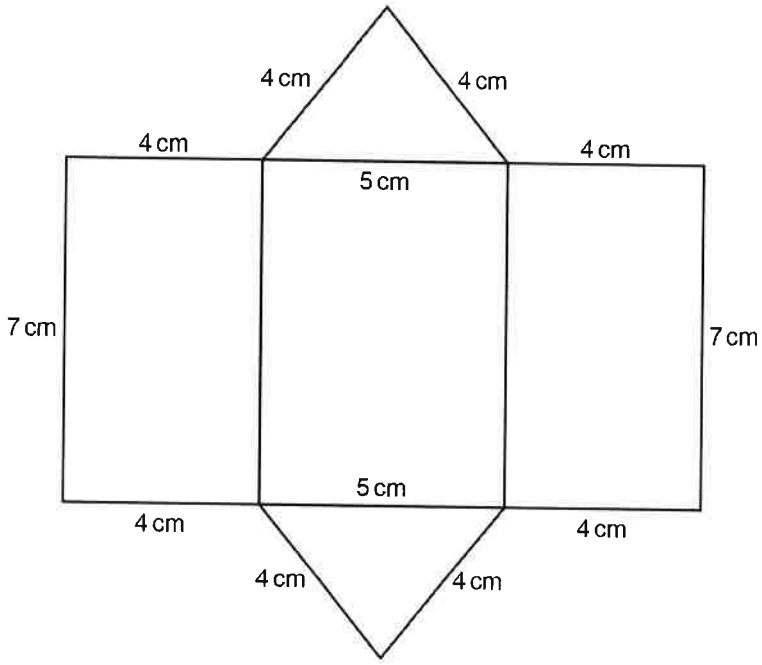
.....cm

(1 mark)

3 Draw a circle of radius 6 cm.

(1 mark)

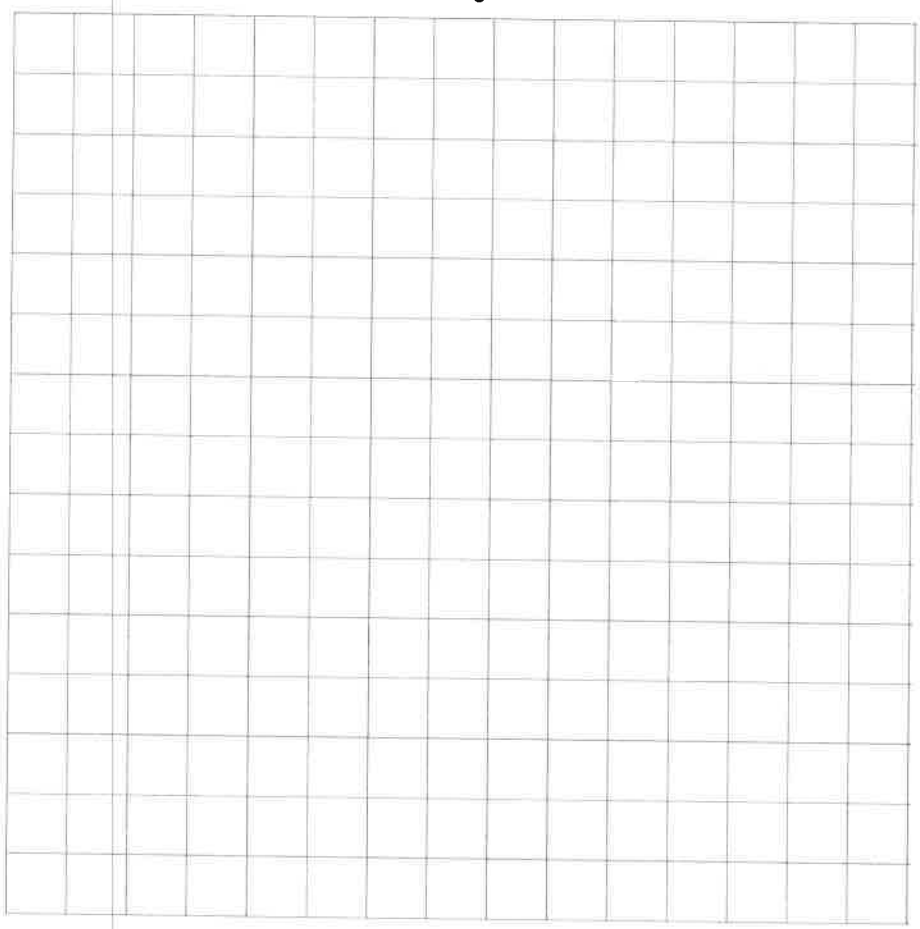
4 Here is a sketch of the net of a triangular prism.



Draw an accurate net for the prism on the squared grid.

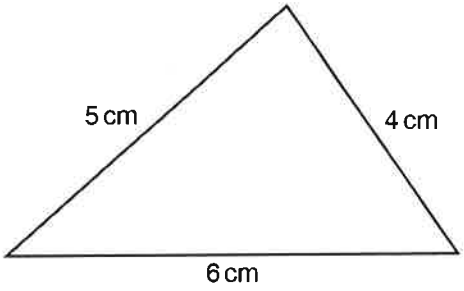
Use a scale of 1 square to 1 cm.

Use a ruler and compasses to construct the triangles.



(3 marks)

5 Using a ruler and compasses, construct an accurate drawing of the triangle.

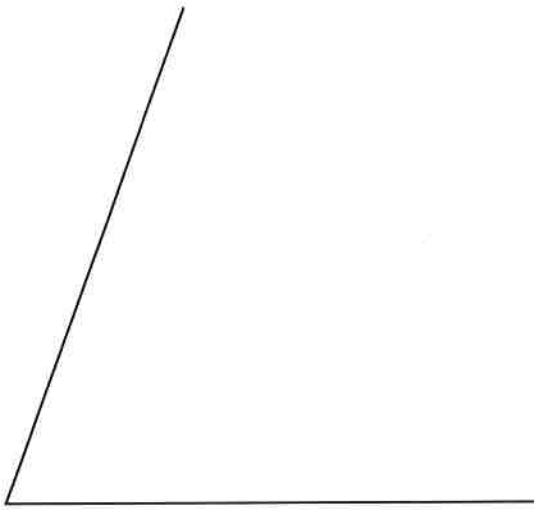


The 6 cm side has been drawn for you.

6 cm

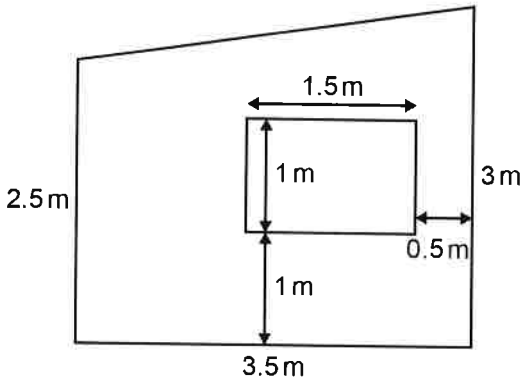
(2 marks)

6 Using ruler and compasses only, construct the bisector of this angle.



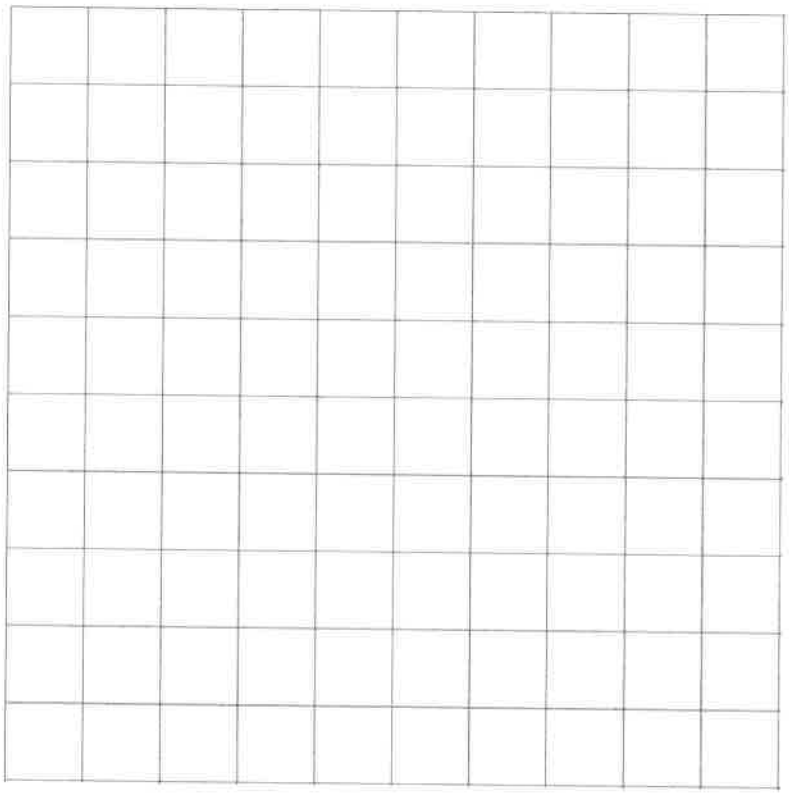
(2 marks)

7 The sketch shows the side view of a shed.



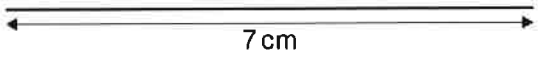
Draw an accurate scale diagram of this side view on the squared grid.

Use a scale of 1 square to 0.5 m.



(3 marks)

8 Construct the perpendicular bisector of this line.

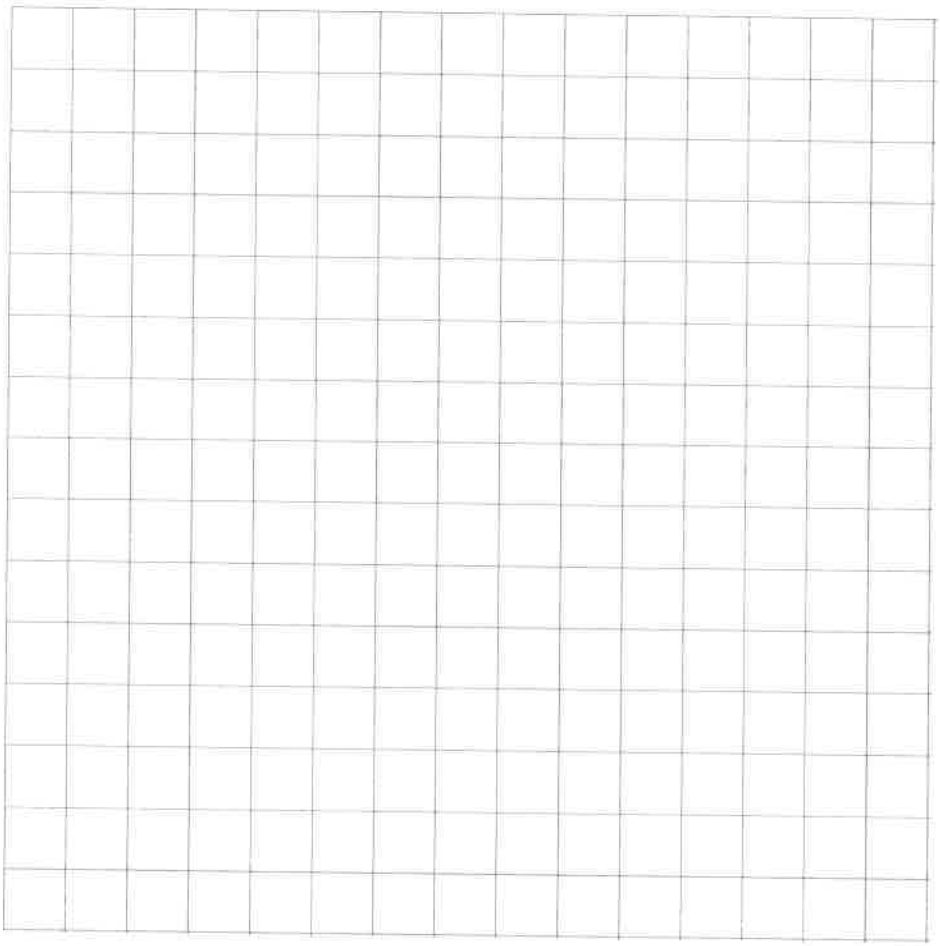


(2 marks)

9 A square-based pyramid has four triangular faces.

Each triangular face is an equilateral triangle of sides the length of 5 squares in the grid below.

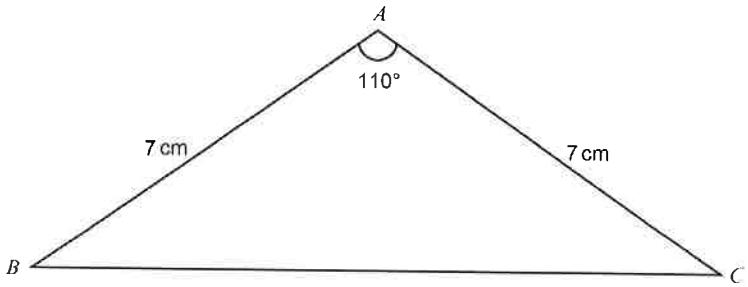
Draw an accurate net of the pyramid, using a ruler and compasses only to construct the triangles.



(2 marks)

10 Show that the perpendicular from A to the side BC is the angle bisector of angle A.

You must show all your construction lines.



(2 marks)

11 An upstairs window is 4.2 metres above the ground.

The wall is at right angles to the ground.

Suki wants to buy a ladder to reach the window.

For safety, the angle between the ground and the ladder **must be exactly** 75°.

a Work out the angle between the ladder and the wall.

.....°

(1 mark)

b Draw a scale diagram to show the wall, ground and ladder.

Use your diagram to work out the length of ladder that Suki should buy.

(2 marks)

Calculator

12 A map has a scale of 1 : 25 000

A road on the map is 5 cm long.

How long is the road in real life?

.....

(2 marks)

13 On a map, two towns are 8 cm apart.

The scale of the map is 1 : 50 000

a How far apart are the two towns in real life?

.....

(2 marks)

b One of the two towns is 6.5 km from a river.

What distance represents 6.5 km on the map?

.....

(2 marks)

Overall mark	**/30**

NAME

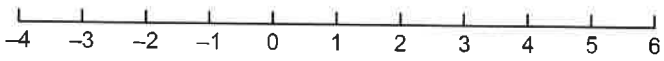
Non-calculator

1 Write the first five terms of the sequence $4n - 3$ in this table.

Position (n)	1	2	3	4	5
Term ($4n - 3$)					

(2 marks)

2 Show the inequality $x > -3$ on this number line.



(1 mark)

3 **a** Find the nth term of the sequence

8, 16, 24, 32, ...

.....

(1 mark)

b Find the 100th term of the sequence.

.....

(1 mark)

c Is 45 a term in the sequence? Explain how you know.

.....

.....

(1 mark)

4 Match each inequality to one of the number lines A to D below.

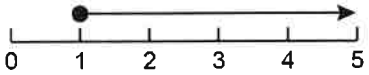
a $x > 1$ .....

b $x \geq 1$ .....

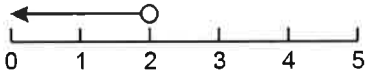
c $x \leq 2$ .....

d $x < 2$ .....

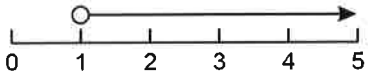
A



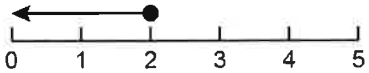
B



C



D



(2 marks)

5 Solve $x^2 + 7 = 71$

giving the positive and negative solutions.

..... and .....

(2 marks)

6 Explain why the inequality $-3 < x < -2$ has no integer solutions.

.....

.....

(1 mark)

7 The table shows values of x and y.

x	1	5	25
y	50	250	1250

Show whether or not x and y are in direct proportion.

(2 marks)

8 Solve the equation $\frac{x+5}{3} = 6$

.....

(2 marks)

9 The formula connecting the values for x and y in the table can be written for y in terms of x as $y = \frac{k}{x}$

x	2	4	10
y	2.5	1.25	0.5

a Find the value of k.

.....

(1 mark)

b Write the formula so that x is given in terms of y.

.....

(2 marks)

Calculator

10 Write the next three terms in this geometric sequence

5, 25, ..., ..., ...

(2 marks)

11 Work out the second term of the sequence with nth term $5n - 4$

.....

(1 mark)

12 Here is a sequence of patterns made from counters.

Pattern 1 **Pattern 2** **Pattern 3**

a Complete the table to show the number of counters for patterns 1 to 5.

Pattern number	1	2	3	4	5
Number of counters					

(1 mark)

b The numbers of counters in the patterns form a sequence.

Work out the nth term of the sequence.

.....

(2 marks)

c Work out the number of counters in the 21st pattern.

.....

(2 marks)

d Jude makes the largest possible pattern with 60 counters.

How many counters are left over?

.....

(2 marks)

13 a Write down the term-to-term rule for this geometric sequence

0.5, 3, 18, ...

.....

(1 mark)

b Find the next two terms.

....

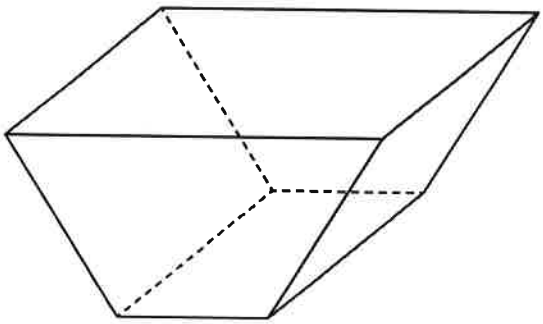
(1 mark)

Overall mark /30

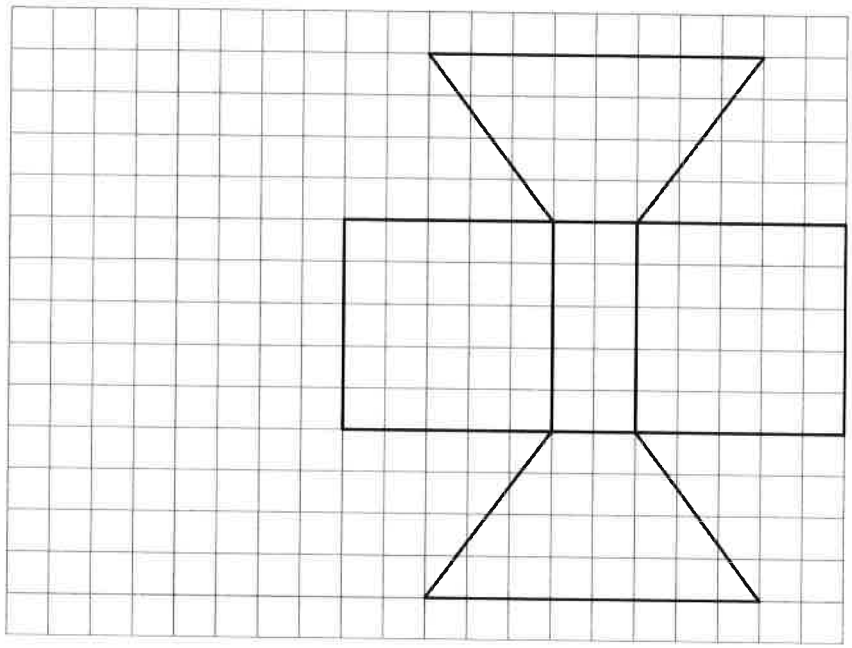
NAME

Non-calculator

1 Here is a solid prism.



a Here is part of the net of the solid prism drawn on squared paper.



Complete the net.

(1 mark)

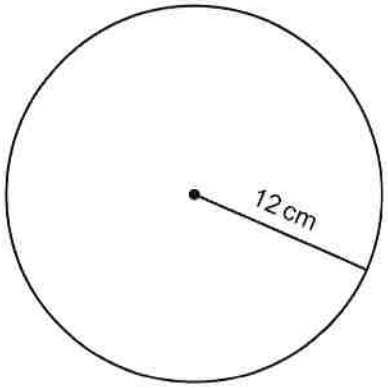
b Each square on the diagram has an area of 1 cm^2.

Work out the surface area of the prism.

.....cm^2

(2 marks)

2 Freddie is working out the circumference of this circle.



He writes

$\text{Circumference} = \pi \times 6$

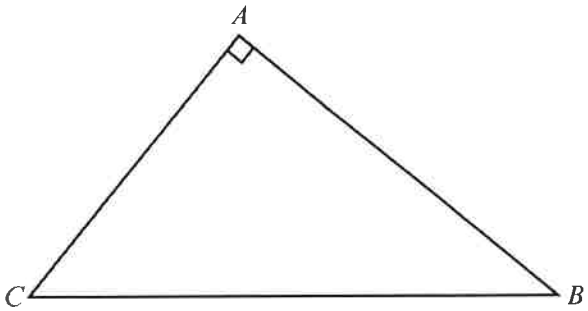
Freddie is not correct. What mistake has he made?

.....

.....

(1 mark)

3 ABC is a right-angled triangle.



Sally says, 'AB is the hypotenuse.'

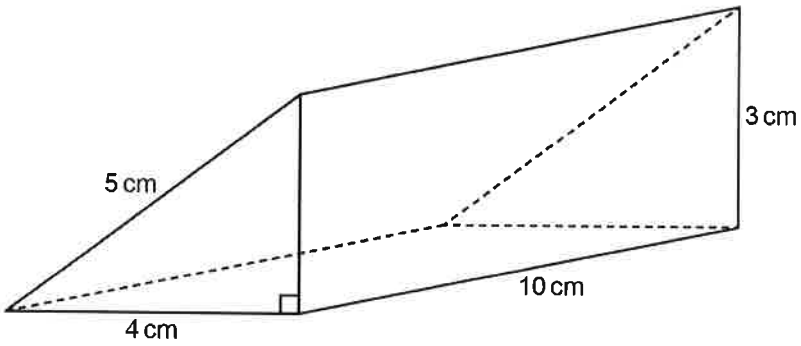
Is Sally correct? Explain.

.....

.....

(1 mark)

4 Here is a prism.



What shape is its cross-section?

.....

(1 mark)

5 A parcel weighs 4 kg, to the nearest kg.

a What is the lower bound of the parcel's weight?

.....kg

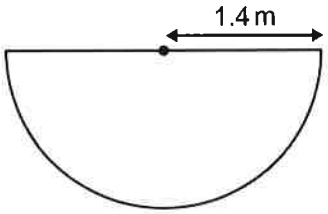
(1 mark)

b What is the upper bound of the parcel's weight?

.....kg

(1 mark)

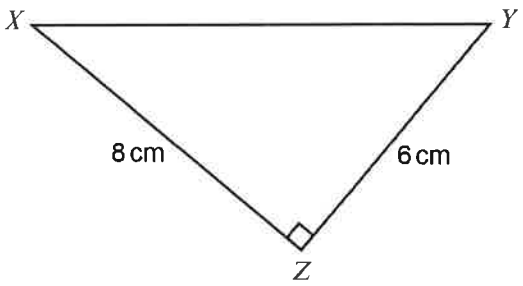
6 Write the calculation to work out the area of this semicircle.



.....

(2 marks)

7 Work out the length XY.



.....cm

(2 marks)

8 A florist tears paper off a roll to wrap flowers.

A 30 cm length of paper is torn off, to the nearest 10 cm.

a What is the upper bound of the length of paper?

.....cm

(1 mark)

b What is the lower bound of the length of paper?

.....cm

(1 mark)

c The paper is torn from a roll that is exactly 0.8 m wide.

Work out the upper and lower bounds for the area, A, of the paper.

Write your answer as an inequality.

.....

(2 marks)

9 The radius of a circular flower bed is 30.5 cm.

Work out the circumference of the flower bed.

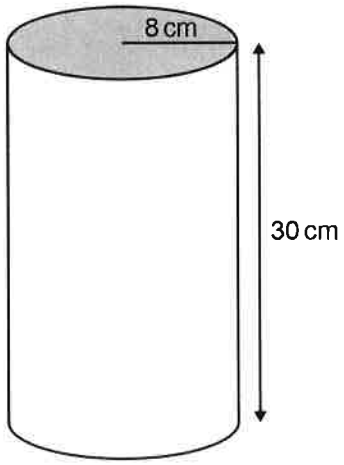
Give your answer in terms of π in its simplest form.

.....cm

(2 marks)

Calculator

10 Here is a jar.



a Work out the area of its lid (shaded).

Give your answer correct to 1 decimal place.

..... cm^2

(2 marks)

b What is the volume of the jar?

Give your answer correct to 3 significant figures.

..... cm^3

(2 marks)

11 A circle has circumference 88 cm.

Work out the diameter of the circle.

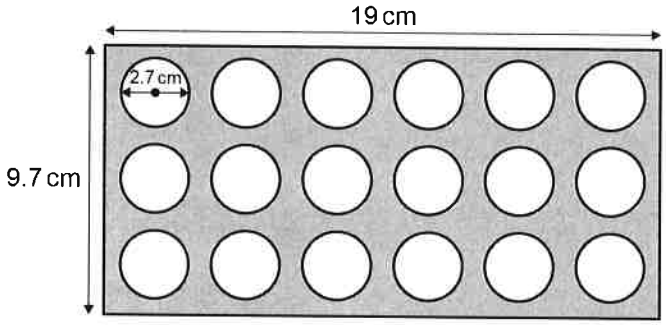
Give your answer correct to 1 decimal place.

..... cm

(2 marks)

12 The diagram shows a metal sheet.

Identical circular metal discs with diameter 2.7 cm are cut from the metal sheet.



What area of metal sheet is left?

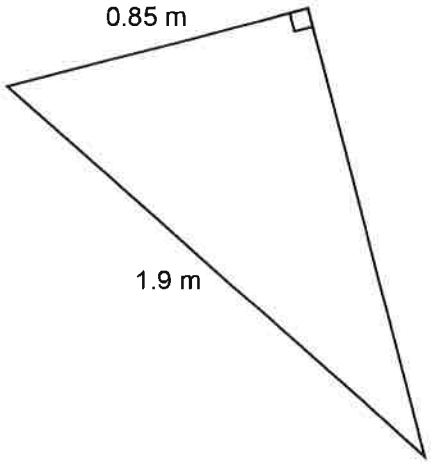
Give your answer correct to 1 decimal place.

..... cm^2

(3 marks)

13 Work out the area of this right-angled triangle.

Give your answer correct to 3 significant figures.



..... m^2

(3 marks)

Overall mark	**/30**

NAME

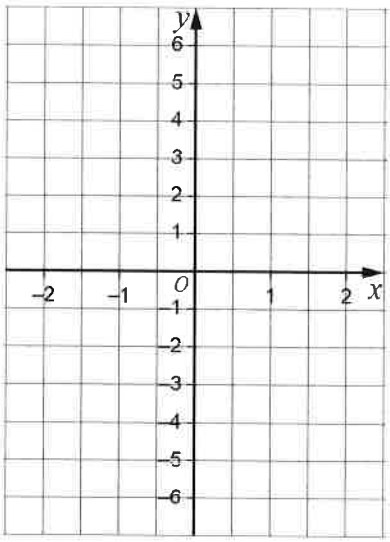
Non-calculator

1 a Complete this table of values for $y = x^2$

x	−2	−1	0	1	2
y	4				

(1 mark)

b On the grid, draw the graph of $y = x^2$ for values of x from −2 to 2



(2 marks)

2 a Write the gradient of the graph of $y = x - 2$

.....

(1 mark)

b Write the y-intercept of the graph of $y = x - 2$

.....

(1 mark)

3 a Write the y-intercept of the graph of $3x + y = 6$

.....

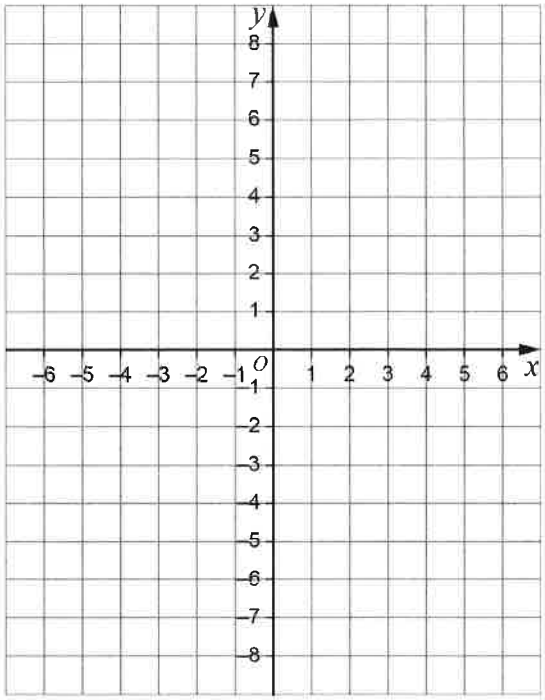
(1 mark)

b Write the x-intercept of the graph of $3x + y = 6$

.....

(1 mark)

c On the grid, draw the graph of $3x + y = 6$



(1 mark)

d On the same grid, draw the graph of $x + y = 4$

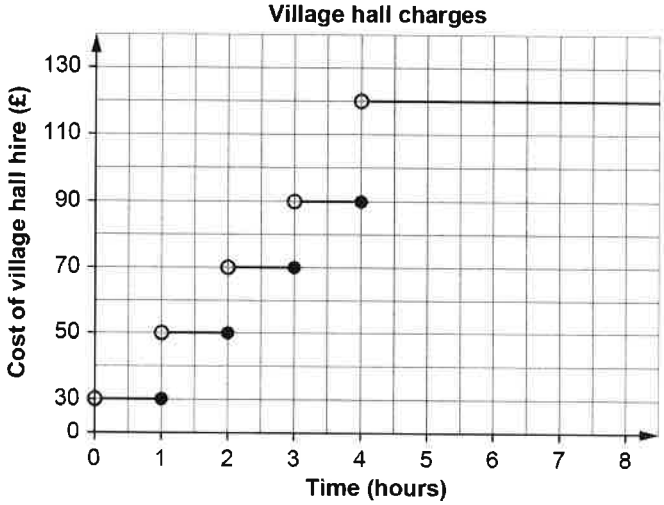
(2 marks)

e Use your graphs to solve the simultaneous equations $3x + y = 6$ and $x + y = 4$.

.....

(2 marks)

4 The graph shows the charges for hiring a village hall.



a There is a $1\frac{1}{2}$ hour yoga class in the village hall.

How much is the hire charge?

£.....

(1 mark)

b How much does it cost to hire the village hall for 3 hours?

£.....

(1 mark)

c The village hall has a maximum hire charge.

What is the maximum charge?

£.....

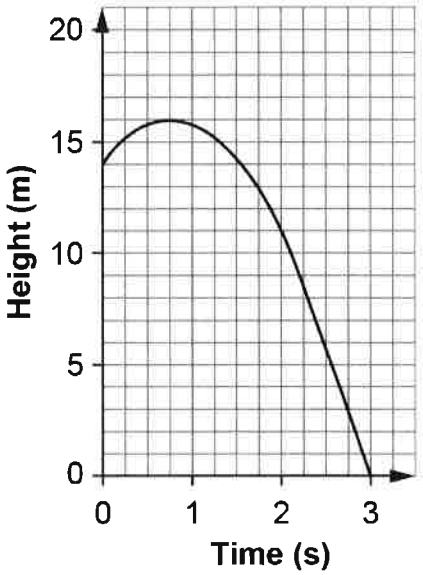
(1 mark)

d What is the cost for each additional hour if you hire the hall for 3 hours or less?

£.....

(1 mark)

5 The graph shows the path of a pebble thrown from a cliff into the sea.



a How high is the cliff?

.....m

(1 mark)

b What is the maximum height above sea level that the pebble reaches?

.....m

(1 mark)

c After how many seconds does the pebble hit the sea?

.....s

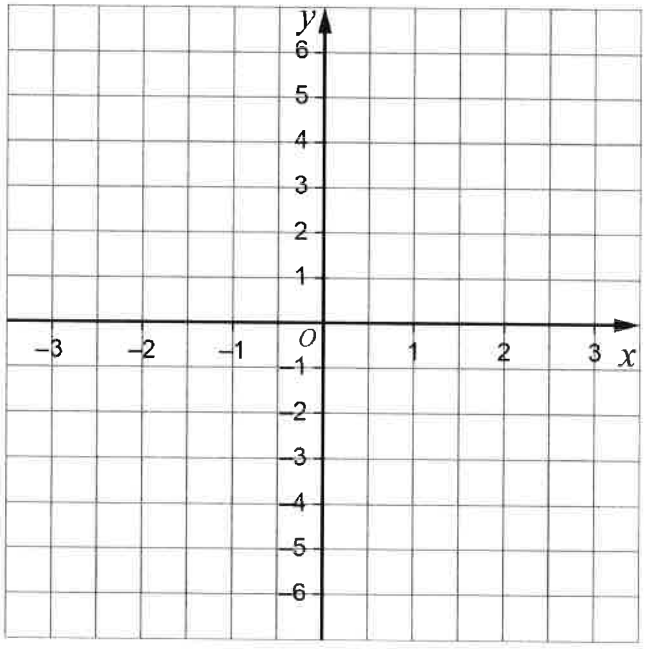
(1 mark)

6 a Complete this table of values for $y = x^2 - 4$

x	−3	−2	−1	0	1	2	3
x^2							
−4	−4	−4	−4	−4	−4	−4	−4
y							

(2 marks)

b Plot the points you found in part a to draw the graph of $y = x^2 - 4$ on the grid.



(2 marks)

7 Andy is A years old. His brother Ron is R years old.

Andy multiplies his own age by 3.

He then subtracts twice Ron's age.

The answer is 6.

Ron subtracts his age from Andy's age.

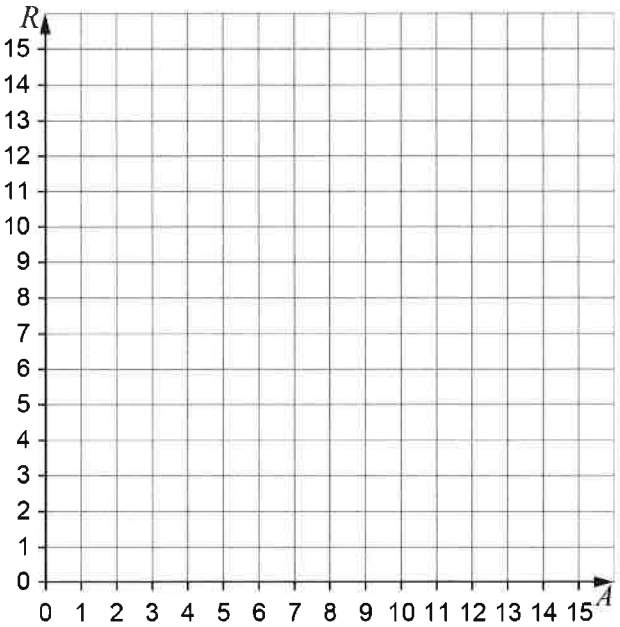
The answer is −2.

a Write a pair of simultanous equations to model Andy's and Ron's ages.

..... and .....

(2 marks)

b On the grid, draw a graph to model the simultaneous equations in part **a**.



(4 marks)

c How old is Andy?

..... years

(1 mark)

Overall mark	**/30**

Maths Progress 3 Support/Core End of Autumn Term Test

NAME

Non-calculator

1 Jay's wage is £11 per hour.

Write an expression in terms of h for Jay's total wage when she works h hours.

.....

(1 mark)

2 Ali estimates $\sqrt{99}$ is 9

Is he correct? Explain why.

.....

.....

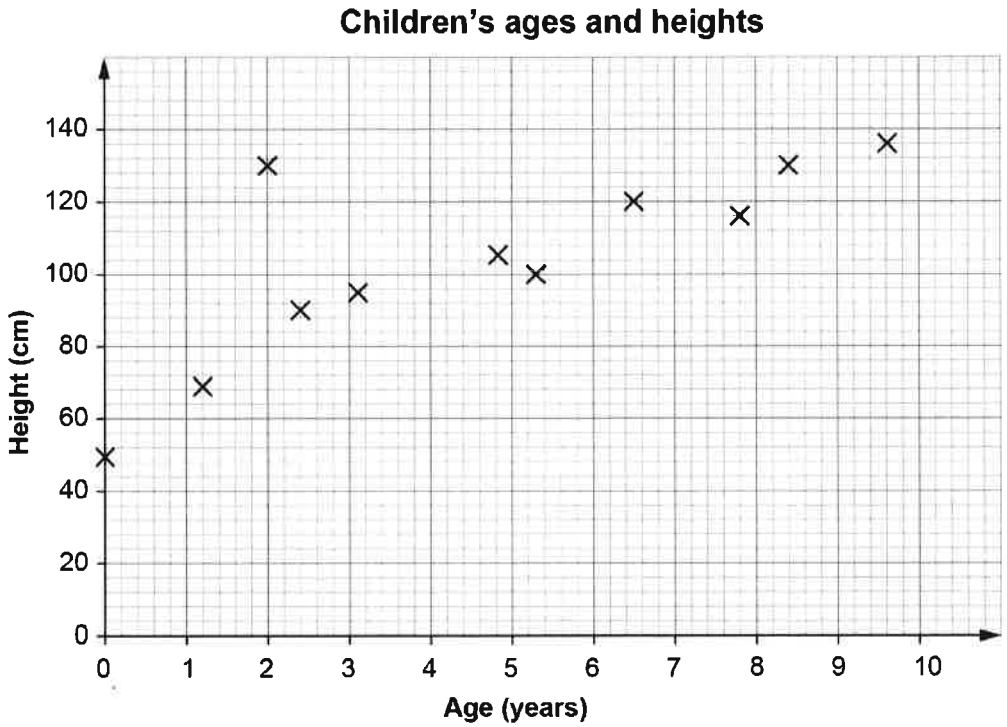
(1 mark)

3 Solve $\frac{5x}{3} = 10$

$x =$ .....

(1 mark)

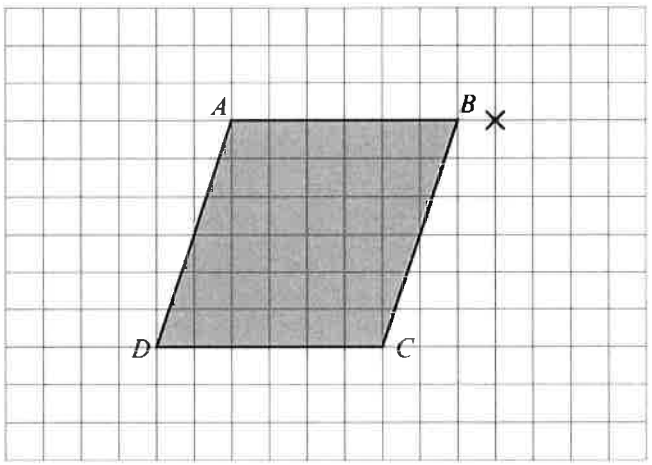
4 The scatter graph below shows the ages and heights of 11 children.



Circle the outlier.

(1 mark)

5 $ABCD$ is a parallelogram.



The parallelogram is enlarged by scale factor $\frac{1}{3}$ using the centre of enlargement × to give the parallelogram $A'B'C'D'$.

On the grid, mark the position of D'.

(2 marks)

6 Write 6×10^3 as an ordinary number.

.....

(1 mark)

7 Work out $2^2 \times 2^3$

Give your answer as a power of 2

.....

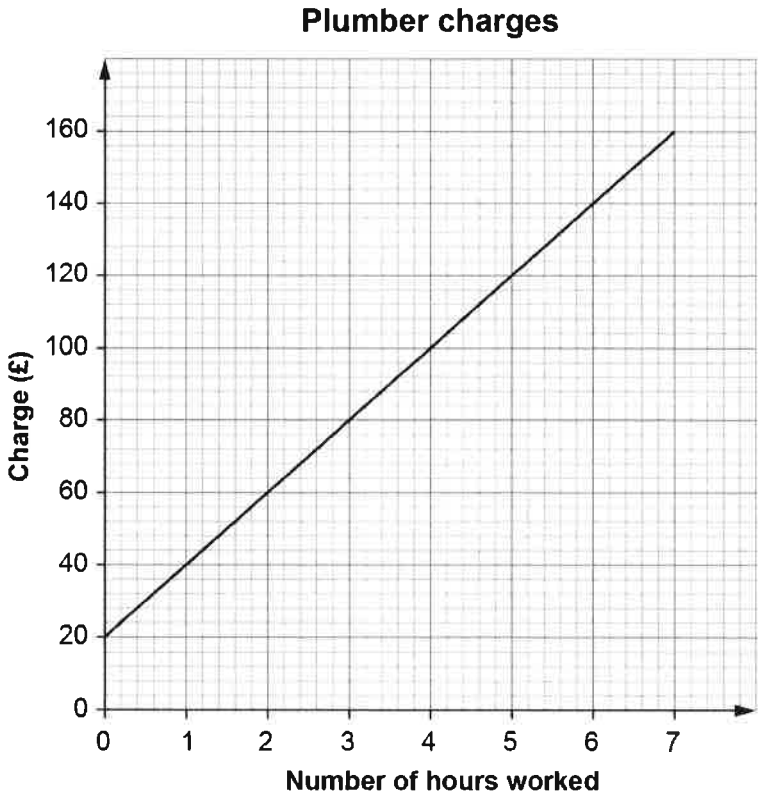
(1 mark)

8 Solve $3x = 5x - 8$

$x =$ .....

(1 mark)

9 The graph shows the amount a plumber charges her customers.



a The plumber charges a call-out fee. How much is it?

£.....

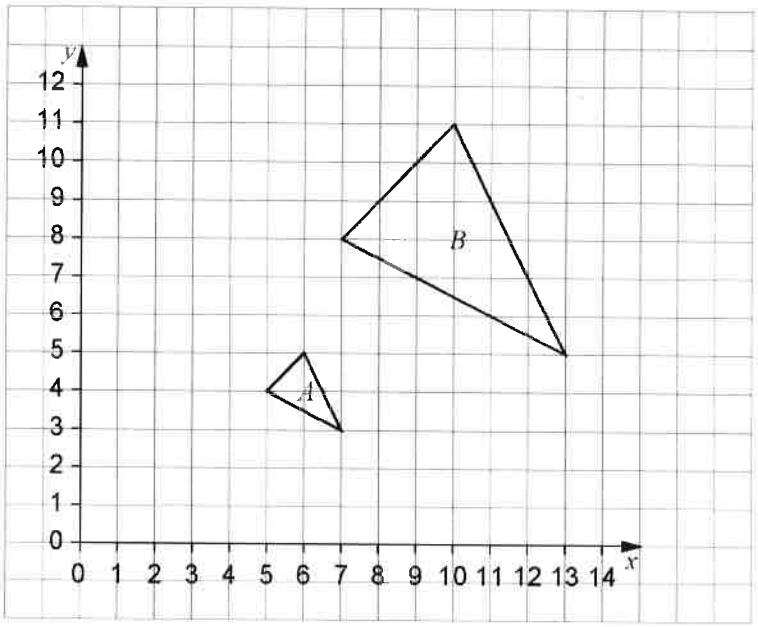
(1 mark)

b Write a formula for the total amount in pounds (£), C, that the plumber charges her customers for h hours' work.

.....

(2 marks)

10 Triangle A is enlarged to give triangle B.



a What is the scale factor of the enlargement?

.....

(1 mark)

b Write down the coordinates of the centre of enlargement.

(..... , ...)

(2 marks)

11 A councillor wants to find out if the people in her town use the local leisure centre.

She sends a questionnaire to the people who live in the two streets alongside the leisure centre.

a Explain why her results could be biased.

.....

.....

(1 mark)

b How could she reduce the bias?

.....

.....

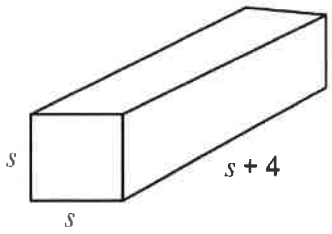
(1 mark)

12 Solve $\frac{x}{4} - 5 = -2$

.....

(2 marks)

13 Here is a cuboid.



Show that an expression for the volume of the cuboid is $s^3 + 4s^2$

(1 mark)

14 Work out $(-4)^5 \div (-4)$

Write your answer as a power of 4

.....

(1 mark)

15 Chen is converting 80 km/h into mph.

He knows that 1 mile $\approx$ 1.6 km.

He works out

$80 \times 1.6 = 128$ mph

What mistake has Chen made?

(1 mark)

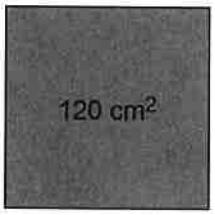
16 Write 3^{-2} as a fraction.

.....

(1 mark)

17 A square has an area of 120 cm^2.

Estimate the length of one of its sides.



.....

(2 marks)

Calculator

18 Box A contains 8 identical staplers.

The cost of box A is £14

a How much does each stapler cost?

£.....

(1 mark)

Box B contains 12 of the same staplers.

The cost of box B is £19.20

b Which box gives better value for money?

Show working to explain your answer.

(2 marks)

19 You can use this formula to calculate speed.

$$S = \frac{D}{T}$$

a Work out the value of S when $D = 152$ and $T = 4.5$

Give your answer to 1 decimal place.

.....

(1 mark)

b Work out the value of D when $S = 86$ and $T = 0.9$

.....

(1 mark)

20 The table shows the marks of 20 students in a spelling test.

Mark	Frequency	Mid-point	Mid-point × Frequency
1–5	11		
6–10	6		
11–15	3		

a Calculate an estimate for the mean mark.

.....

(3 marks)

b Which class contains the median?

.....

(1 mark)

21 Poppy buys a bicycle for £400

Three years later, she sells it for £176

What percentage loss has she made?

.....%

(2 marks)

22 A speedboat travels 130 km at a speed of 104 km/h.

For how long does the boat travel?

Give your answer in hours and minutes.

.....

(2 marks)

23 Work out 0.035×0.8

Write your answer in standard form.

.....

(1 mark)

24 $3^3 \times 3^n = 3^7$

Work out the value of n.

.....

(1 mark)

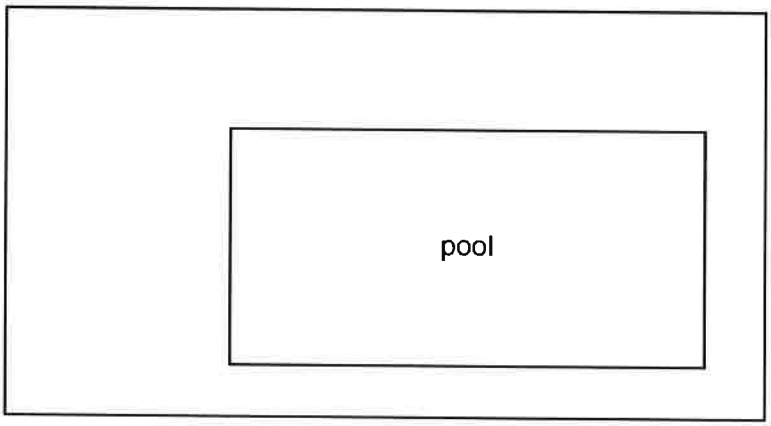
Overall mark	**/40**

NAME

Non-calculator

1 The scale diagram shows a garden with a swimming pool.

Work out the length and width of the pool in real life.

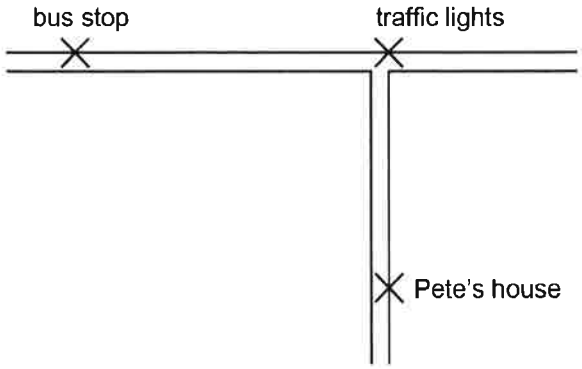


Scale: 1 cm represents 4 m

..... and .....

(2 marks)

2 The real-life distance from the bus stop to the traffic lights is 100 m.



Work out the real-life distance from the traffic lights to Pete's house.

You must show all your working.

.....

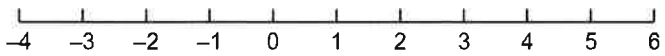
(3 marks)

3 Write the first five terms of the sequence $3n + 1$ in this table.

Position (n)	1	2	3	4	5
Term ($3n + 1$)					

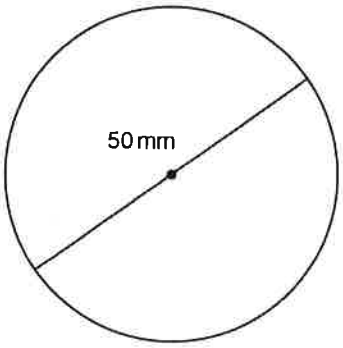
(2 marks)

4 Show the inequality $x \leq 3$ on this number line.



(1 mark)

5 Ross is calculating the area of this circle:



He writes

$Area = \pi \times 50 \times 2$

What mistakes has he made?

.....

.....

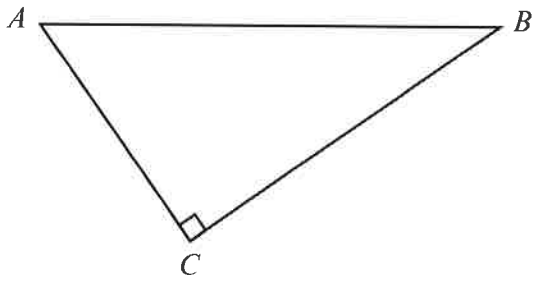
.....

.....

(2 marks)

6 ABC is a right-angled triangle.

Explain why AB is the hypotenuse.



.....

.....

(1 mark)

7 The nth term of a sequence is $9 - 2n$

a Work out the first three terms of the sequence.

.....

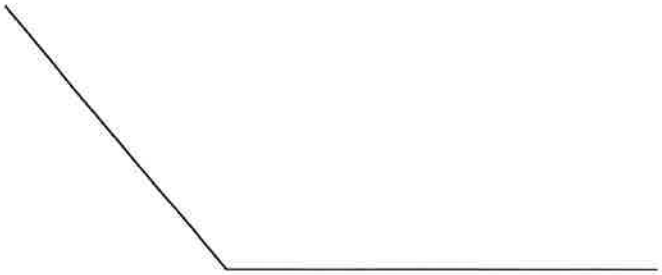
(2 marks)

b Work out the 20th term of the sequence.

.....

(1 mark)

8 Construct the angle bisector of this obtuse angle.

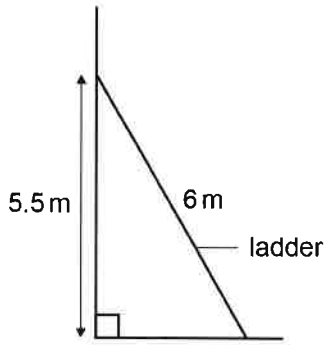


(2 marks)

9 Construct a triangle with sides 3 cm, 5 cm and 6 cm.

(2 marks)

10 The diagram shows a ladder leaning against a wall.



a Make an accurate scale drawing of this diagram.

(2 marks)

b How far is the base of the ladder from the base of the wall?

..... m

(1 mark)

11 5 melons cost £3.50

7 melons cost £5

Are the number of melons and the cost in direct proportion? Explain how you know.

.....

.....

.....

.....

(2 marks)

12 The radius of a circular table is 0.4 m.

Work out the circumference of the table.

Give your answer in terms of π.

.....

(2 marks)

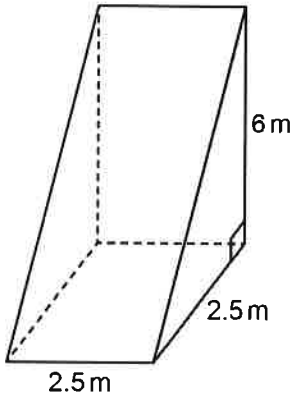
Calculator

13 Write the next three terms in this **geometric** sequence

4, 12, _____, _____, _____

(2 marks)

14 Here is a prism



a What shape is its cross-section?

.....

(1 mark)

b Work out the volume of the prism.

..... m^3

(2 marks)

15 UK pounds (£) are in direct proportion to euros (€).

£20 buys €21.70

How many euros will £48 buy?

€.....

(2 marks)

16 The diameter of a bracelet is 17.8 cm.

Work out its circumference.

Round your answer to an appropriate degree of accuracy.

..... cm

(2 marks)

17 Solve $x^2 - 1 = 50$ giving the positive and negative solutions to 1 decimal place.

..... and .....

(3 marks)

18 A cloth of length 9 m is cut to the nearest 10 cm.

a What is the upper bound of the length of the cloth?

.....

(1 mark)

b What is the lower bound of the length of the cloth?

.....

(1 mark)

c The cloth is cut from a roll that is exactly 1.6 m wide.

Work out the lower bound for the area of the piece of cloth.

.....

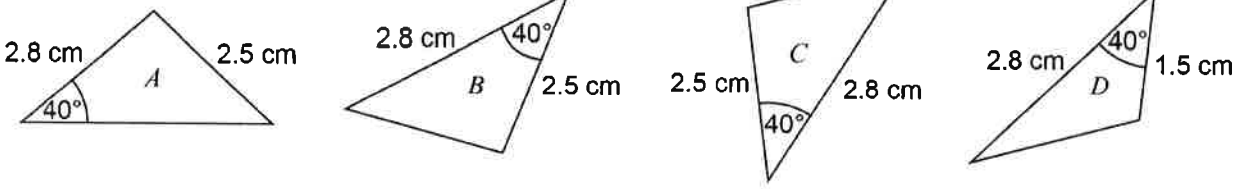
(1 mark)

Overall mark	**/40**

NAME

Non-calculator

1 Which two of these triangles are congruent for the reason SAS (two sides and the included angle)?



..... and .....

(1 mark)

2 The two-way table gives information about all the T-shirts Alex sells on Monday.

	Small	Medium	Large	Total
Black	6	9	10	25
White	5	14	6	25
Total	11	23	16	50

a How many small white T-shirts were sold on Monday?

.....

(1 mark)

b How many T-shirts did Alex sell on Monday?

.....

(1 mark)

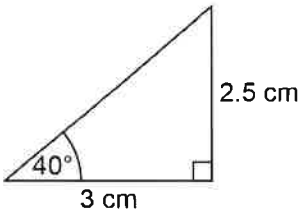
One of these T-shirts is picked at random.

c Work out the probability that it is a medium black T-shirt.

.....

(1 mark)

3 Look at this triangle.



a What is the length of the side that is opposite the 40° angle?

.....cm

(1 mark)

b What is the length of the side that is adjacent to the 40° angle?

.....cm

(1 mark)

4 **a** Complete this table of values for $y = 3x^2$

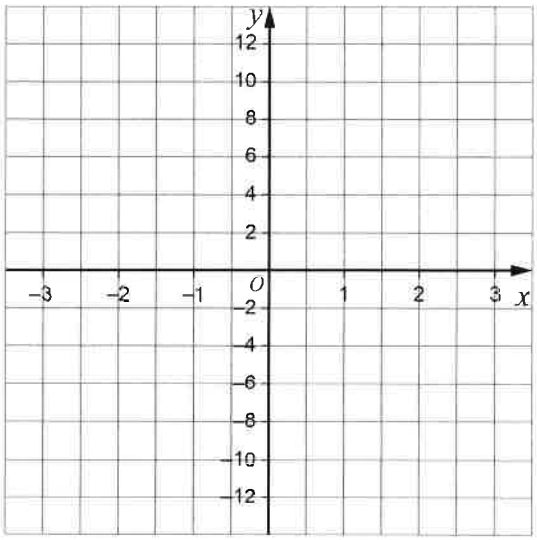
x	−2	−1	0	1	2
x^2	4				
y	12				

(2 marks)

b On the coordinate grid, plot the points from your table in part **a**.

Join the points with a smooth curve.

Label your graph with its equation.



(2 marks)

5 Lines A and B are parallel.

Line A has equation

$y = -5x + 4$

Complete this equation for line B.

$y = \ldots\ldots\ldots x + 2$

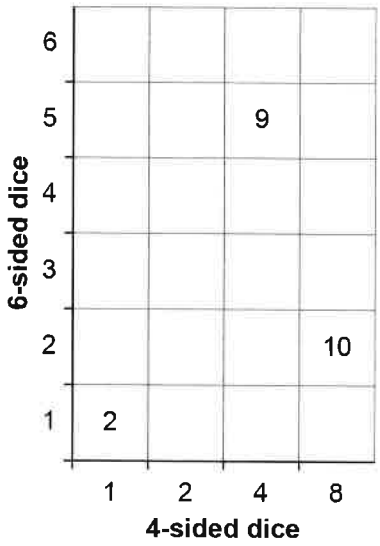
(1 mark)

6 An ordinary dice and a four-sided dice are rolled.

The numbers on the four-sided dice are 1, 2, 4, 8.

The scores on the two dice are added together.

Complete this sample space diagram to show all the possible outcomes.



(2 marks)

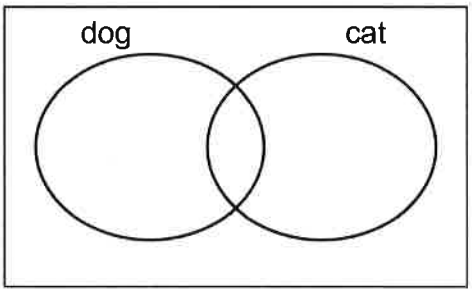
7 In a group of 70 people

32 have a dog

15 have a dog and a cat

18 have no dog and no cat.

a Complete the Venn diagram to show this information.



(3 marks)

One of these people is picked at random.

b Work out the probability that they have a cat but not a dog.

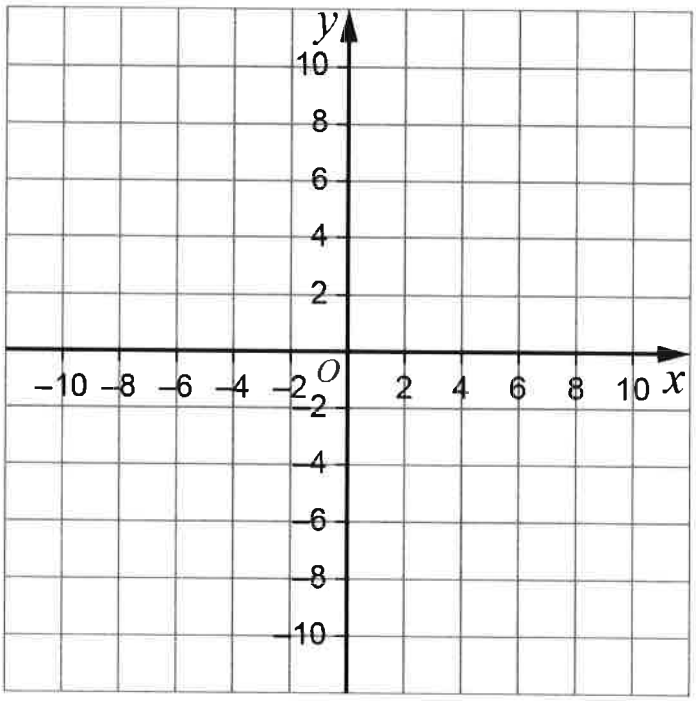
.....

(1 mark)

8 **a** On the grid, draw graphs with the following equations.

i) $x + y = 9$

ii) $5x - 2y = 10$



(2 marks)

b Using your graphs, find the solution to the simultaneous equations

$x + y = 9$

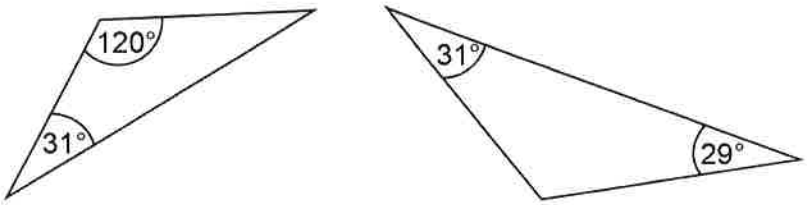
$5x - 2y = 10$

$x =$ .....

$y =$ .....

(2 marks)

9 Explain why these two triangles are similar.



.....

.....

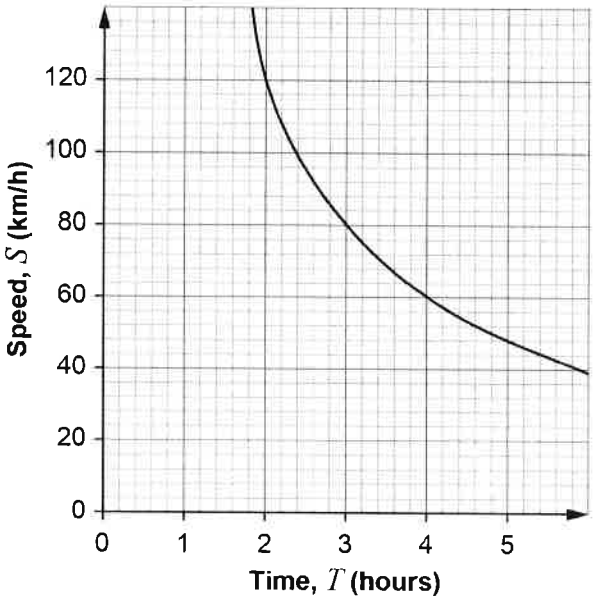
.....

.....

(2 marks)

10 A lorry regularly travels a distance of 240 km between two warehouses.

The graph shows the relationship between the lorry's average speed and the time it takes on some of these journeys.



Here is a table of values from the graph.

Time, T (hours)	2	2.5	3	5
Speed, S (km/h)	120	96	80	48

a The relationship between T and S is $S = \frac{k}{T}$.

Use values from the table to work out the value of k.

k = ...

(2 marks)

b Write an equation connecting T and S for the lorry.

.....

(1 mark)

Calculator

11 A box contains packets of crisps.

There are three flavours: sweet chilli, prawn cocktail, and ready salted.

One of these packets of crisps is picked at random.

The table shows the probability of picking sweet chilli and the probability of picking ready salted.

Flavour	Sweet chilli	Prawn cocktail	Ready salted
Probability	0.25		0.35

a Work out the probability of picking either sweet chilli or ready salted crisps.

.....

(1 mark)

b Work out the probability of picking prawn cocktail crisps.

.....

(2 marks)

12 In a bag, there are only red counters, white counters and blue counters.

Tisha picks a counter from the bag at random and writes down its colour.

Then she puts the counter back in the bag.

The table shows her results.

Colour	Red	White	Blue
Frequency	24	35	29

a How many times did Tisha pick a counter altogether?

.....

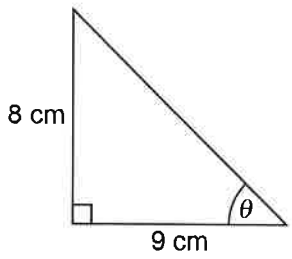
(1 mark)

b Write the experimental probability of picking a white counter at random from the bag.

.....

(1 mark)

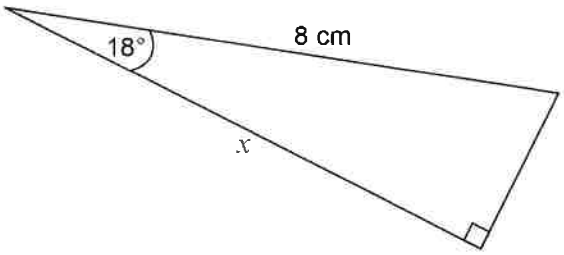
13 Use the $\tan^{-1}$ function on your calculator to work out the size of angle θ in this triangle.



.....°

(1 mark)

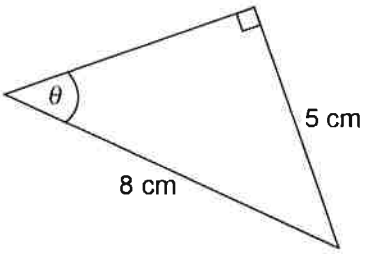
14 Use the cosine ratio to work out the value of x.



.....cm

(2 marks)

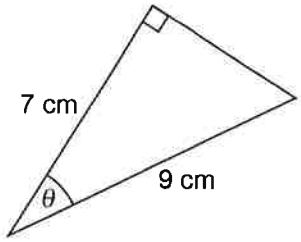
15 Use the sine ratio to work out the size of angle θ.



.....°

(2 marks)

16 Use the cosine ratio to work out the size of angle θ.



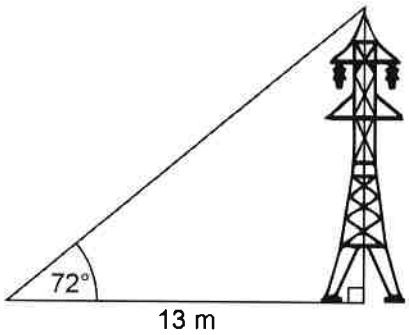
..... °

(2 marks)

17 A farmer wants to know the height of a pylon on his land.

He measures 13 metres from the bottom of the pylon to a point on the ground.

The angle to the top of the pylon is 72°.



Use the tangent ratio to work out the height of the pylon.

Give your answer to an appropriate degree of accuracy.

..... m

(2 marks)

Overall mark	**/40**