National 4 AVU

Revision

Paper 1 – Non-Calculator – 20 minutes

This will consist of short response questions, based on a selection of knowledge and skills developed in the Course, each of which require the use of number processes in contextualised situations.

The questions may cover the following:

- ♦ use of whole number percentages
- ♦ calculation of the mean of a data set; the mean should require division of a whole number by a single-digit whole number and rounding of the answer to two decimal places
- ♦ calculating a non-unitary fraction of a quantity
- ♦ adding two decimal numbers and then subtracting from the result
- ♦ multiplying a decimal number by a whole number
- ♦ using fractions in context
- ♦ interpreting statistical diagrams

Paper 2 – Calculator – 40 minutes

This will consist of short and extended response questions based on a selection of knowledge and skills developed in the Course.

The questions may cover the following:

- ♦ solving a linear equation requiring simplification
- ♦ solving a problem using area or volume
- ♦ creating and then using a formula
- ♦ using the relationship involving speed, distance and time, where the time is given or calculated as hours and minutes.
- ♦ use of Pythagoras' theorem in a problem
- ♦ use of trigonometry to calculate a side or angle of a right-angled triangle
- ♦ solving a problem involving shape and coordinates
- ♦ Calculating probabilities
- ♦ Constructing statistical diagrams

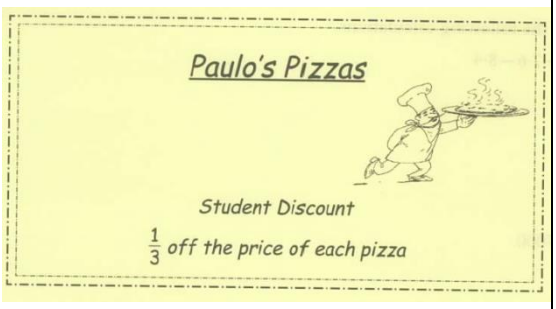
Practice papers of a similar level of depth and challenge can be found at:

http://www.knightswoodsecondary.org.uk/personal/Resources/National4/N4_practice_addedvalue_paper.pdf

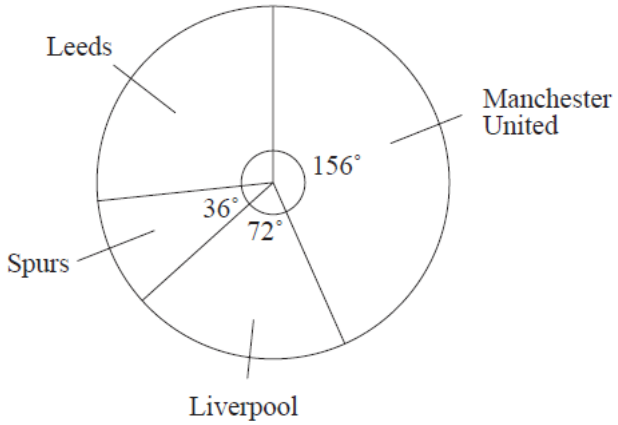
Solutions to the Knightswood practice paper are available at youtube.com/mryoungsmaths

http://fcis.ea.n-lanark.sch.uk/~cvalmaths/FOV2-0007CF03/FOV2-000CE2B0/

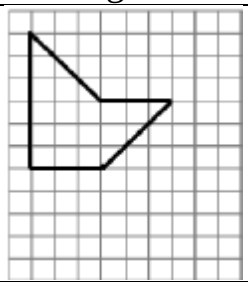
Further revision exercises are available at http://maths.gahs.org.uk/files/2014/08/nat4-value-added-assessment-revision.pdf

Q	**Paper 1 Revision**	Marks
1)	Pamela sees a bracelet costing £65 in a jeweller's window. The jeweller offers Pamela a 5% discount. Pamela decides to buy the bracelet. How much does she pay? 	3
2)	Emily is a student and she buys a pizza from Paulo's Pizzas. She chooses a pizza which is normally £8.49. How much will Emily pay for the pizza? 	3
3)	In the "Fame Show", the percentage of telephone votes cast for each act is shown below. Plastik Money 23% Brian Martins 35% Starshine 30% Carrie Gordon 12% Altogether 15 000 000 votes were cast. How many votes did Starshine receive? 	3
4)	A Maths textbook cost £9.49. How much will it cost to buy 8 new textbooks? 	2
5)	The amount of pocket money received by 6 children is: £8, £10, £5, £12, £10, £14 Calculate the mean amount of pocket money. Round your answer to the nearest penny. 	3

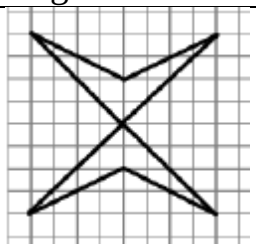
6)	Alan and Kate take their 12 year old twin daughters to the Urban Wildlife Park. Instead of buying four individual tickets, they decide to buy a Family Ticket. How much money do they save? **Urban Wildlife Park** **Admission Charges** Adult £13·50 Children aged 3 and under £10·75 Children aged 4 to 16 £11·50 Family Ticket (1 Adult & 2 Children) £32·00 Family Ticket (2 Adults & 2 Children) £42·00 Family Ticket (2 Adults & 3 Children) £51·00 	3
7)	The Venue can hold 900 people. On Friday it was only 80% full. How many people were at The Venue on Friday? 	2
8)	A bed shop is having a sale. **ALL BEDS** $\frac{2}{5}$ **OFF THE NORMAL PRICE** The normal price of a bed is £760. Find the sale price of this bed. 	3
9)	The pie chart show the football teams supported by 60 people. a) What is the angle representing Leeds? b) How many people support Liverpool? c) How many people support Manchester United?	4



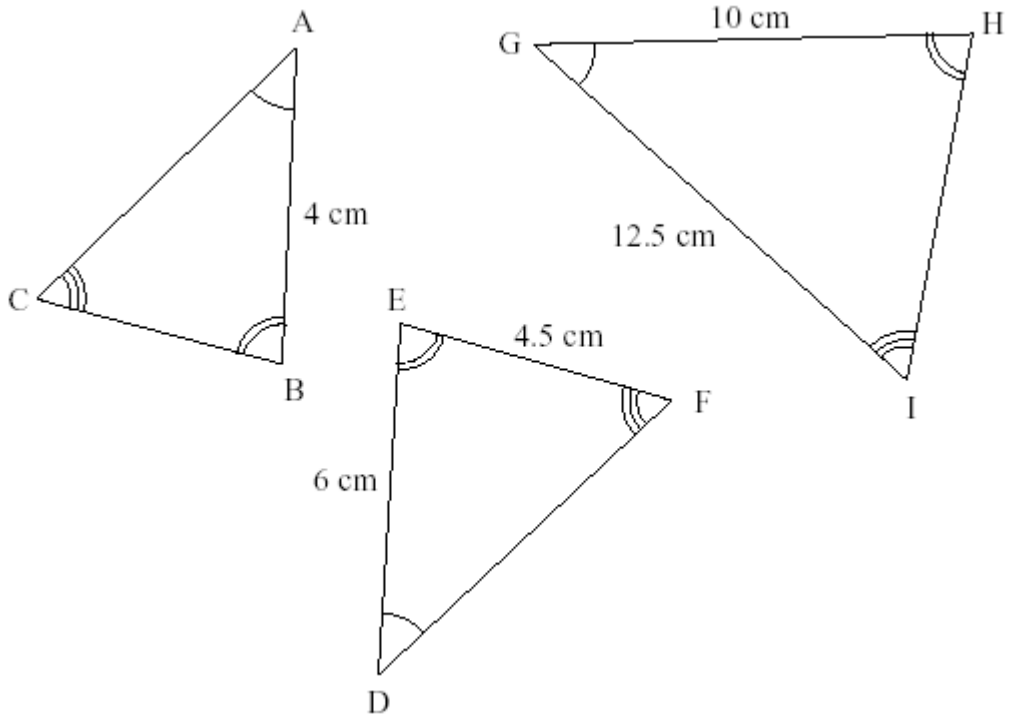
10) Copy and enlarge the shapes below by the given scale factor.

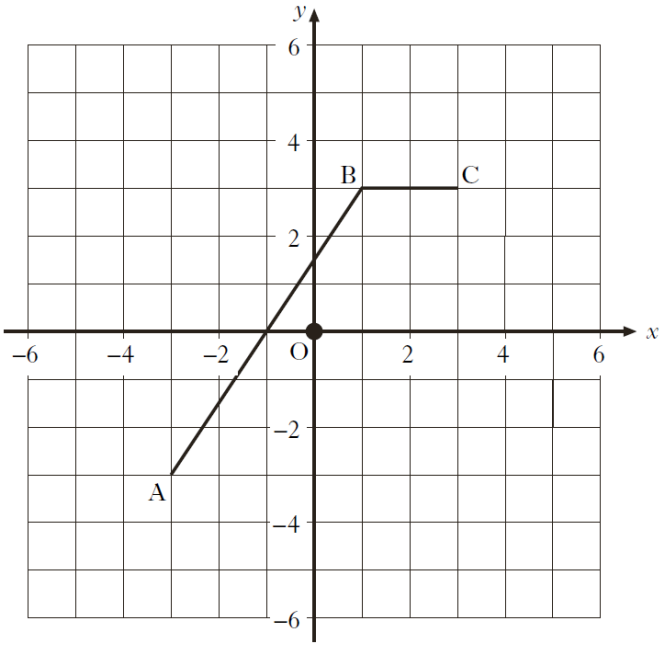
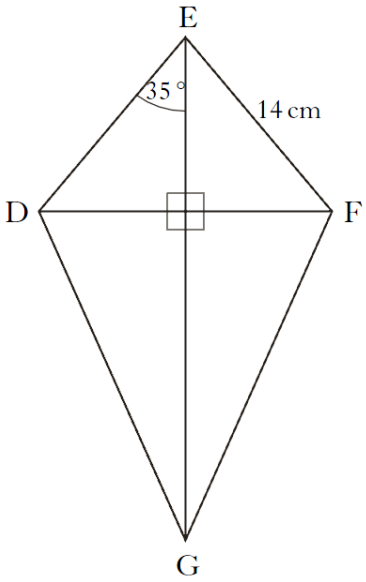


Enlarge by a factor of $\frac{5}{3}$

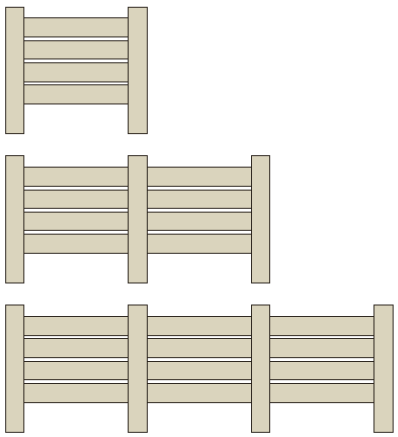


Enlarge by a factor of $\frac{5}{2}$

11)	Given that triangles DEF and GHI are enlargements of triangle ABC calculate the missing lengths.  	
12)	Dean mixes 1.48 litres of orange squash with 6.2 lites of water to make an orange drink. He uses 5.85 litres of the drink at a children's party. How much of the orange drink does he have left? 	2

Q	Paper 2 Revision	Marks
1)	A Sprinter train travels at an average speed of 144 kilometres per hour. The train takes 1 hour 15 minutes to travel between Dingwall and Aberdeen. Calculate the distance between Dingwall and Aberdeen. 	2
2)	AB and BC are two sides of a kite ABCD.  Copy the diagram and plot the point D to complete the kite.	1
3)	DEFG is a kite: • Angle DEG = 35° • EF = 14cm  Calculate the length of DF.	4

4) A children's playground is to be fenced
The fence is made in sections using lengths of wood as shown below.



1 section

2 sections

3 sections

(a) Copy and complete the table below.

Number of sections (s)	1	2	3	4	5		12
Number of lengths of wood (w)	6	11					

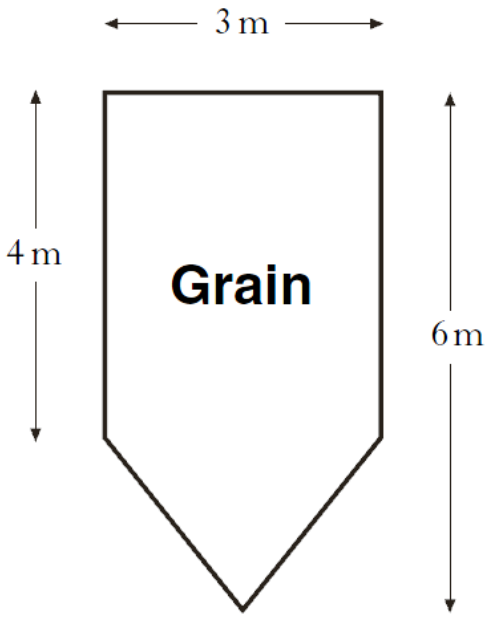
2

(b) Write down a formula for calculating the number of lengths of wood (w), when you know the number of sections (s). 2

(c) A fence has been made from 81 lengths of wood.
How many sections are in this fence?
Show all of your working.

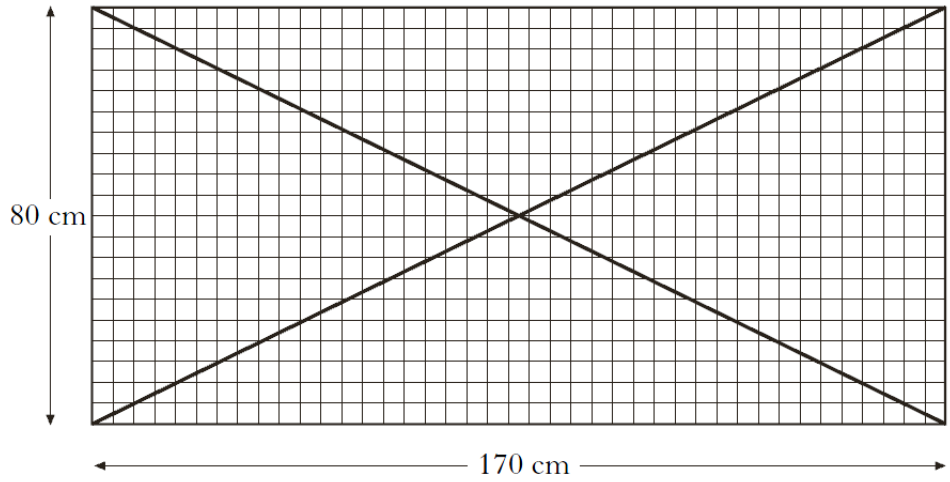
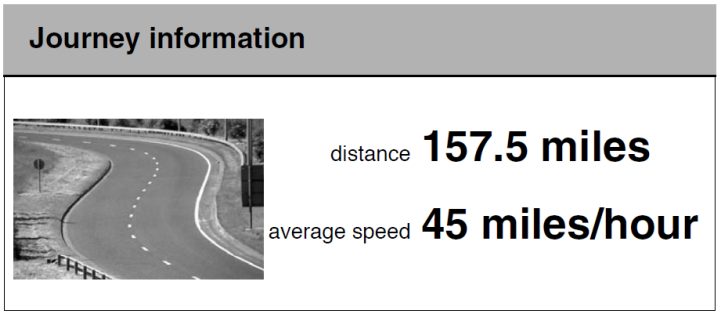
2

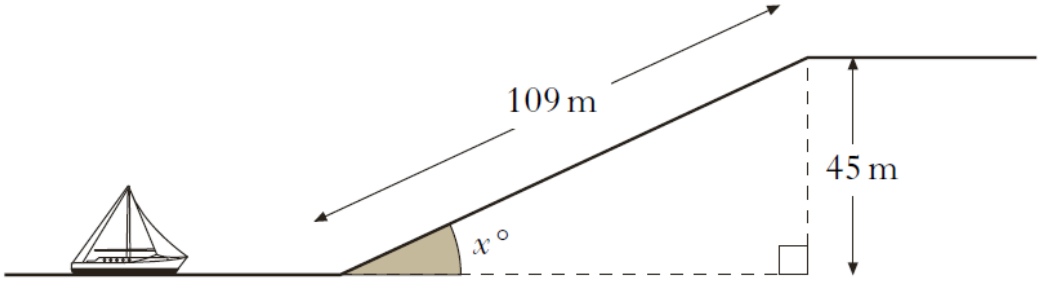
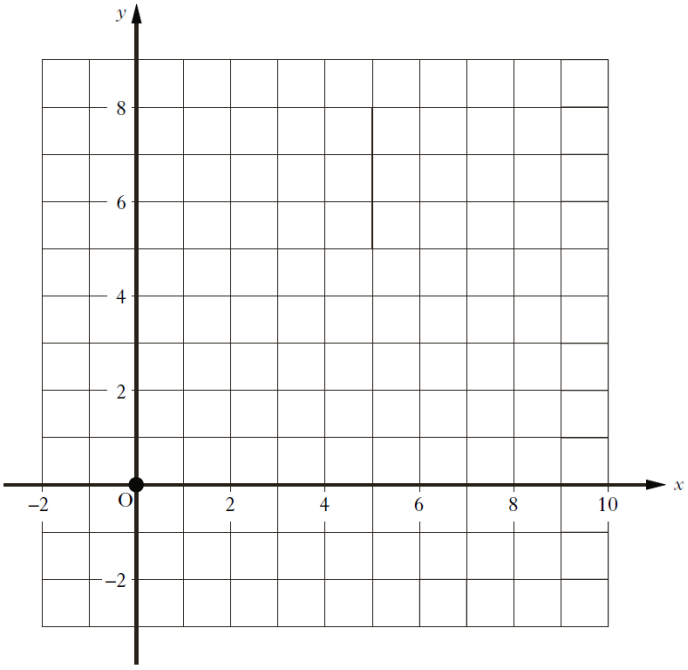
5) The end face of a grain hopper is shown in the diagram.



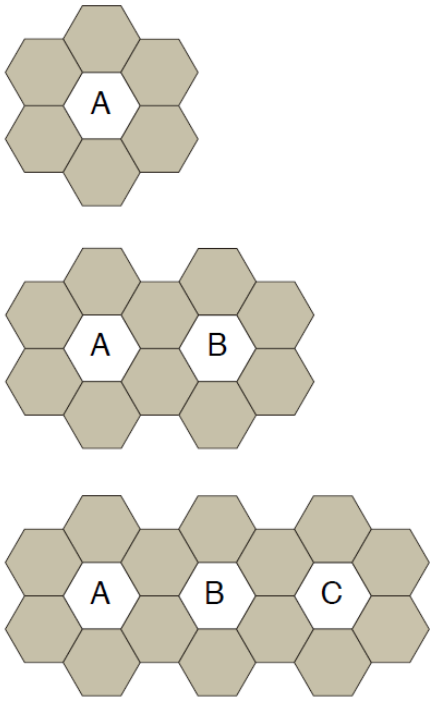
Calculate the area of the end face.

3

6)	Solve algebraically $7t - 3 = t + 45$	3
7)	A rectangular metal grill for a window is shown below. Two diagonal metal bars strengthen the grill.  Find the length of one of the metal bars. Round your answer to the nearest centimetre.	4
8)	Charlie's new car has an on-board computer. At the end of a journey the car's computer displays the information below.  Use the information above to calculate the time he has taken for his journey. Give your answer in hours and minutes.	4

9)	A boat elevator is used to take a boat from the lower canal to the upper canal. The boat elevator is in the shape of a triangle. The length of the hypotenuse is 109metres. The height of the triangle is 45 metres.  Calculate the size of the shaded angle $x°$.	3
10)	(a) Copy the grid below and plot the points A(2,6), B(8,2) and C(6,-1).  	2
	(b) Plot a fourth point D so that ABCD is a rectangle.	1
	(c) On the grid, show the point where the diagonals of the rectangle intersect. Write down the coordinates of this point.	2

11) Carla is laying a path in a nursery school.
She is using a mixture of alphabet tiles and coloured tiles.



(*a*) Complete the table below.

Number of alphabet tiles (*a*)	1	2	3	4	5		12
Number of coloured tiles (*c*)	6	10					

2

(*b*) Write down a formula for calculating the number of coloured tiles (*c*) when you know the number of alphabet tiles (*a*).

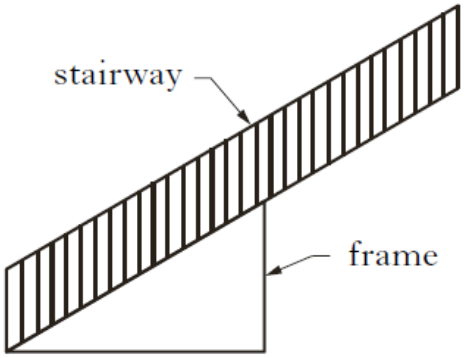
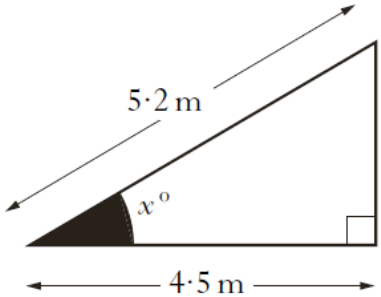
2

(*c*) Carla uses 86 coloured tiles to make the path.
How many alphabet tiles will be in the path?

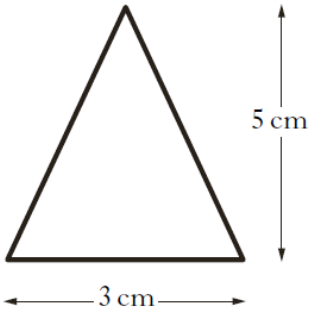
2

12) For safety reasons the speed limit outside Fairfield Park is 20 miles per hour.
The distance between the speed limit signs outside Fairfield Park is half a mile.
A van took 2 minutes to travel between these signs.
Was the van travelling at a safe speed?
Give a reason for your answer.

3

13)	Solve algebraically $25 = 7x + 4$.	2
14)	Ahmed is making a frame to strengthen a stairway in a shopping centre.  He needs to know the angle the stairway makes with the floor, as shown in the diagram below. The hypotenuse of the frame is 5·2m and the horizontal distance is 4·5m.  Calculate the size of the shaded angle x °.	3
15)	Naveen drives from Dumfries to Manchester. A 28 mile part of his journey is affected by roadworks. It takes him 40 minutes to drive this part of his journey. Calculate his average speed for this part of his journey. Give your answer in miles per hour. 	3

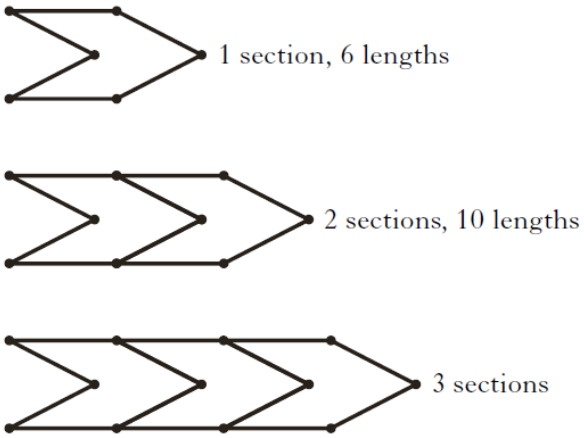
16) An earring in the shape of an isosceles triangle is made from silver wire.
The dimensions of the earring are shown on the diagram below.



Calculate the length of silver wire needed to make a **pair** of earrings.
Do not use a scale drawing.

4

17) Margaret is working on the design for a gold bracelet.
She is using gold lengths to make each section.



(*a*) Copy and complete the table below.

Number of sections (*s*)	1	2	3	4	5		10
Number of gold lengths (*g*)	6	10					

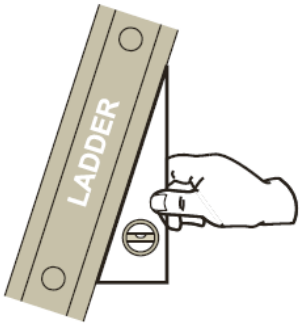
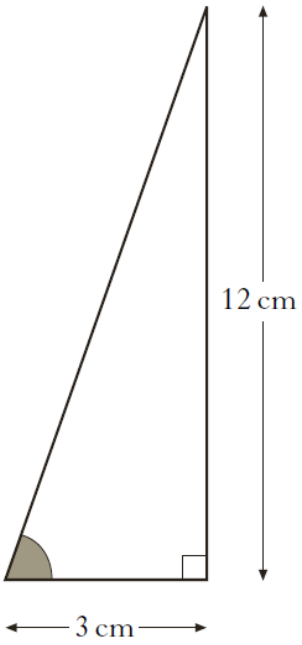
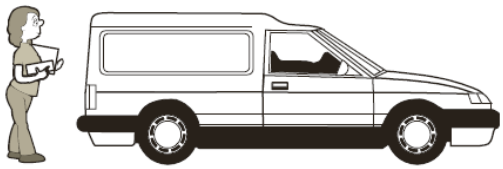
2

(*b*) Write down a formula for calculating the number of gold lengths, (*g*), when you know the number of sections (*s*).

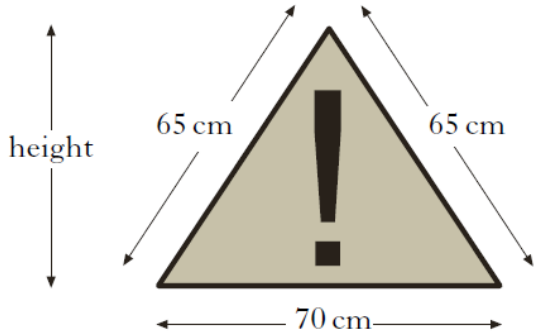
2

(*c*) Margaret uses 66 gold lengths to make a bracelet.
How many sections does this bracelet contain?

2

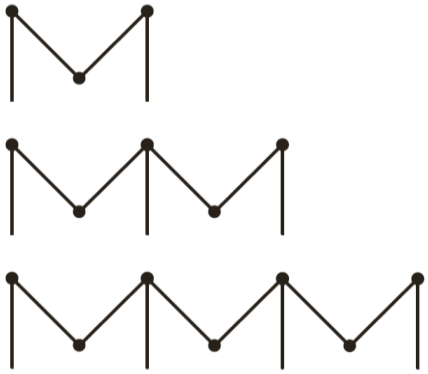
18)	Solve algebraically $5m - 3 = 37 + m$.	3
19)	Larry has invented a device for checking that ladders are positioned at the correct angle. His design for the device is given below. Calculate the size of the shaded angle.  	3
20)	Vicky makes a number of deliveries in her van. When the van is moving the on-board computer records the total distance and the average speed. Last Wednesday the computer recorded • distance = 162 miles • average speed = 36 miles per hour.  Including stops, Vicky took 6 hours 55 minutes to complete her deliveries. For how long was Vicky's van stationary?	4

21) A warning sign is in the shape of an isosceles triangle.



Calculate the height of the sign. 4

22) Mhairi makes necklaces in M shapes using silver bars.



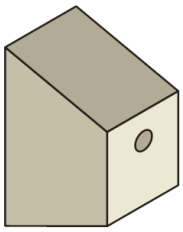
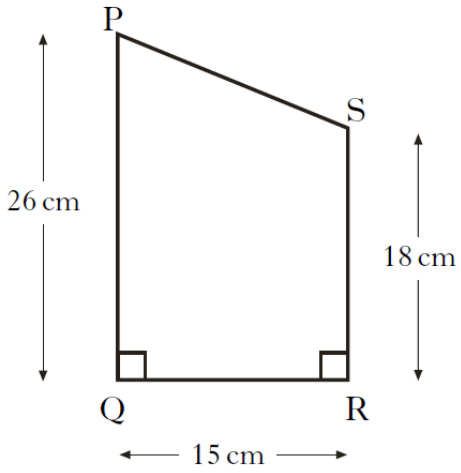
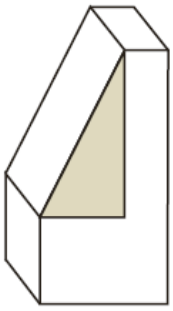
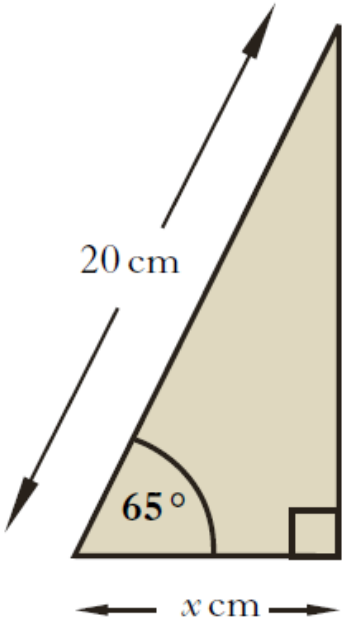
(a) Copy and complete the table below.

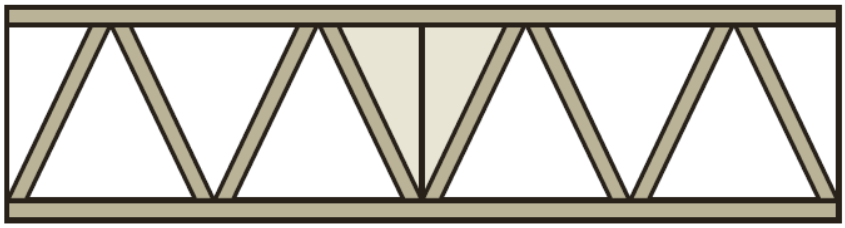
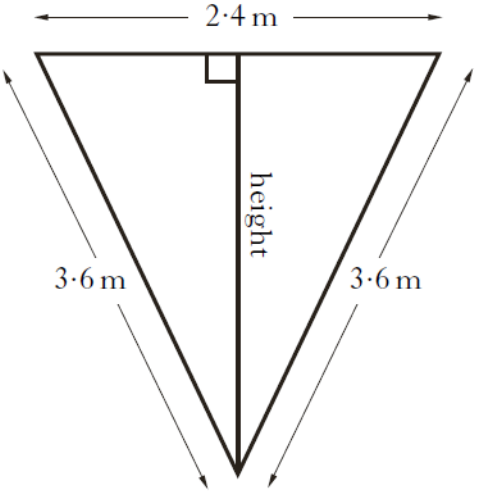
Number of M-shapes (m)	1	2	3	4		15
Number of bars (b)	4	7				

2

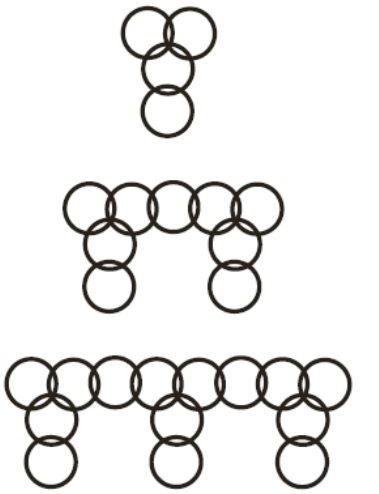
(b) Write down a formula for calculating the number of bars (b) when you know the number of M-shapes (m). 2

(c) Mhairi has 76 silver bars.
How many M-shapes can she make? 2

23)	Lewis is designing a bird box for his garden. The dimensions for the side of the box are shown in the diagram below.   Calculate the length of side PS.	4
24)	The shaded part of a garden light is triangular.   • the triangle is right angled • the sloping edge is 20 centimetres long • the angle between the base and the sloping edge is 65 °. Calculate the value of *x*.	3

25)	A steel plate in the shape of an isosceles triangle is used to strengthen a bridge.  The dimensions of the isosceles triangle are shown below.  Calculate the height of the steel plate. **Do not use a scale drawing.**	4
26)	In the Annual Fun Run, Lucy ran 12 kilometres in 1 hour 15 minutes. Calculate her average speed in kilometres per hour.  	3
27)	Solve algebraically $4x - 3 = x + 21.$	3

28) Samira is designing a chain belt.
Each section of the belt is made from metal rings as shown below.



1 section, 4 rings

2 sections, 9 rings

3 sections

(*a*) Complete the table below.

Number of sections (*s*)	1	2	3	4	5		11
Number of metal rings (*r*)	4	9					

2

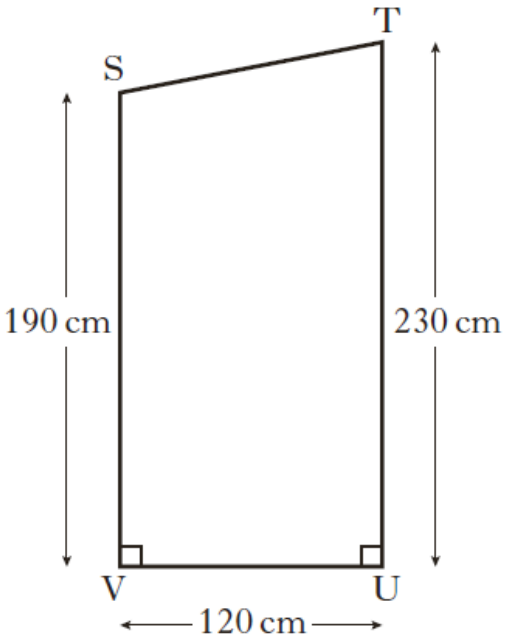
(*b*) Write down a formula for calculating the number of rings (*r*), when you know the number of sections (*s*).

2

(*c*) Samira uses 79 rings to make her belt.
How many sections does her belt have?

2

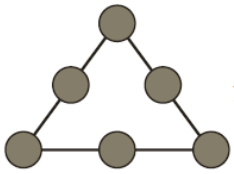
29) Maggie has bought a garden shed.
The dimensions for one side of the shed a
shown in the diagram opposite.



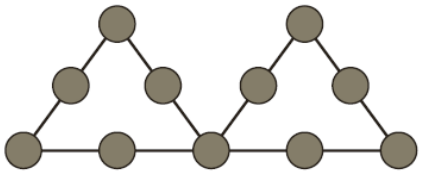
Calculate the length of ST.
Do not use a scale drawing.

4

30) An amusement arcade has a lighting effect in the shape of triangles with coloured lights attached.
The lighting effect can be assembled in sections as shown below.



1 section



2 sections

(*a*) Complete the table below.

Number of sections (*s*)	1	2	3	4	5		12
Number of coloured lights (*c*)	6	11					

2

(*b*) Write down a formula for calculating the number of coloured lights (*c*) when you know the number of sections (*s*). 2

(*c*) The amusement arcade's lighting effect uses a total of 116 coloured lights.
How many sections are in the lighting effect? 2

31) At the World Athletic Championships the mean time for the first semi-final of the 100 metres was 9·98 seconds.

For the second semi-final the times, in seconds, were:

10·21 10·04 9·92 9·98 10·04 9·94 9·9 9·73.

Was the mean time for the second semi-final better than the mean time for the first semi-final?

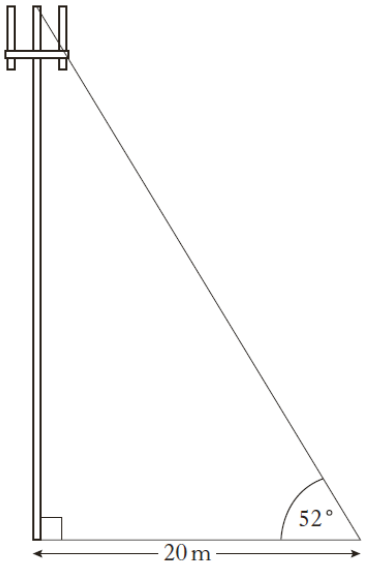
Give a reason for your answer. 4

32) A surveyor has to calculate the height of a mobile phone mast.

From a point 20 metres from the base of the mast, the angle of elevation to the top is 52 °.

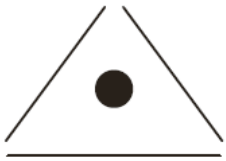
Calculate the height of the mobile phone mast.

Round your answer to 1 decimal place.
Do not use a scale drawing.

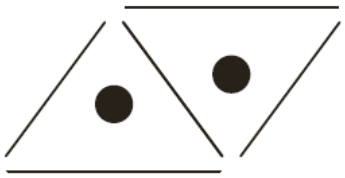


4

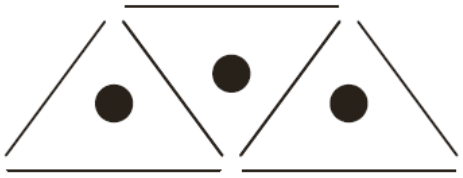
33) A wallpaper pattern consists of lines and dots.



Shape 1



Shape 2



Shape 3

(*a*) Complete the table below.

Number of dots (D)	1	2	3	4	5		14
Number of lines (L)	3	5					

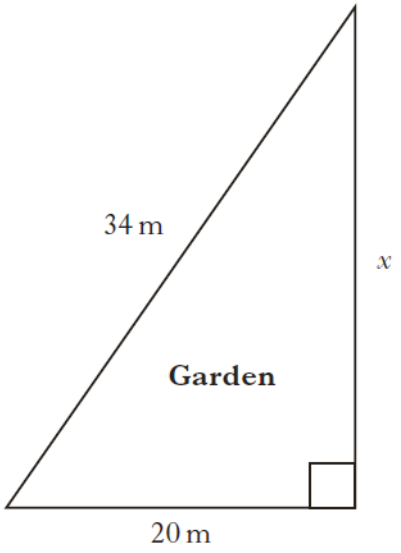
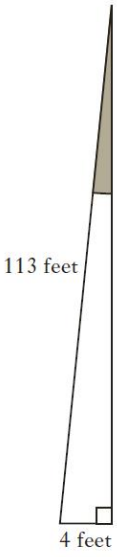
2

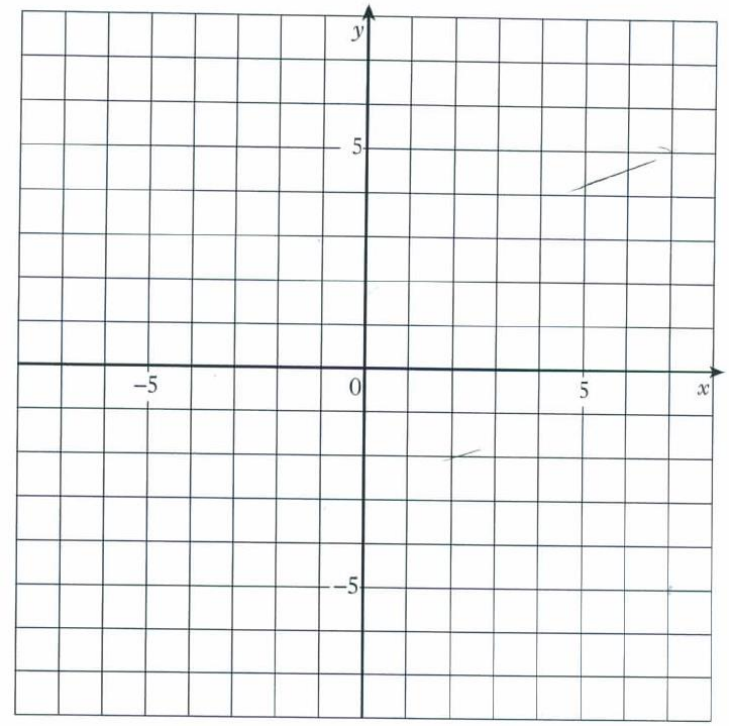
(*b*) Write down a formula for calculating the number of lines (L) when you know the number of dots (D).

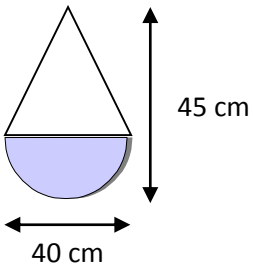
2

(*c*) A pattern has been made using 77 lines.
How many dots are in the pattern?

2

34)	Alison's garden is in the shape of a right angled triangle. She measured two sides of the garden. Calculate the length, x, of the third side of her garden. Round your answer to one decimal place. **Do not use a scale drawing.**  	4
35)	The Elaxtra car runs on electricity. It runs for eight hours before needing to be charged. Will the car be able to travel 315 kilometres at an average speed of 42 kilometres per hour before needing to be recharged? **Give a reason for your answer.** 	3
36)	Belfast has a leaning clock tower. The leaning of the clock tower is shown in the diagram below.   Calculate the size of the shaded angle.	3

37)	(a) Copy the grid below and plot the points A(7,5), B(5,-1) and C(-1,-3).  (b) Plot a fourth point D so that ABCD is a rhombus.	1 2
38)	A coffee shop has been tracking its customer numbers and its daily takings. The information is shown in the table below. Takings £ | 120 | 112 | 115 | 85 | 70 | 72 | 105 | 113 Number of Customers | 30 | 26 | 28 | 20 | 12 | 18 | 25 | 27 a) Draw a scattergraph to illustrate the data b) Draw a best fitting line for this scattergraph c) On a Tuesday, the coffee shop served 29 customers. Use your line of best fit to estimate the takings that day. d) On Thursday, the coffee shop's takings was £95. They estimated that they served 25 people. Is this a reasonable estimate?	6
39)	Which is more likely, picking a vowel from the word PROBABILITY or rolling a number more than 4 or on a dice.? Justify your answer.	3
40)	Which is more likely, picking prime number between 10 and 20 or spinning a number less than 4 on an eight sided spinner.	3

41)	Mr Young is designing a badge. Calculate the area of the badge below.  	5