

Practice Unit Assessment (1) for National 4 Expressions and Formulae

1. (a) Expand the brackets:

$$5(2m - 7)$$

- (b) Expand the brackets and simplify:

$$2(4k + 3) + 2k.$$

2. Factorise $4x + 32$.

3. Simplify $3m + 5n + 6m - 2n$.

4. (a) When $x = 2$ and $y = 3$, find the value of $5x - 3y$.

- (b) Norrie is a plumber.

He calculates the cost of a job using the formula:

$$C = 26.5H + 1.5M$$

where C is the cost (in pounds), H is the number of hours he works, and M is the number of miles he travels to the job.

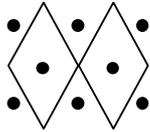
On one job he worked for 7 hours and travelled 32 miles.

Calculate how much Norrie charged for this particular job.

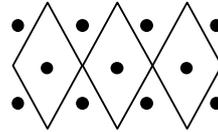
5. Milly bought a new top which has some coloured glass diamonds and beads round the neck. Here is how the pattern is built up.



Pattern 1
1 Diamond



Pattern 2
2 Diamonds



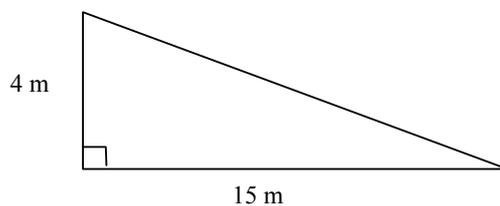
Pattern 3
3 Diamonds

- (a) Copy and complete the table for the number of diamonds (D) and number of beads (B) in other patterns.

Number of Diamonds (D)	1	2	3	4	5		10
Number of Beads (B)	5	8					

- (b) Write down a formula for calculating the number of beads (B) needed for any number of diamonds (D).
- (c) A pattern has 50 beads. How many diamonds does it have?
You must show your working.

6. A skateboard ramp has been designed to have the following dimensions.



The ramp can only be used in competitions if the gradient of the slope is greater than 0.3.

- (a) Calculate the gradient of the slope.
- (b) Can this ramp be used in a competition? Give a reason for your answer.

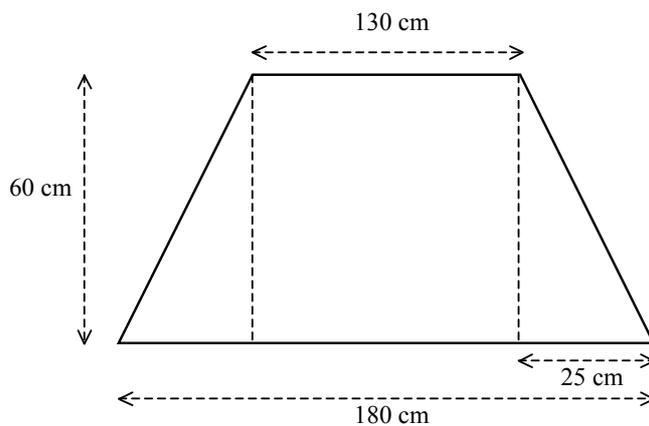
7. The speed limit outside schools is 20 miles per hour. The warning sign for this is shown below. The diameter of the sign is 30 cm.



- (a) Calculate the circumference of the sign.
- (b) Calculate the area of the sign.
8. A car windscreen is formed from a 'curved' trapezium.

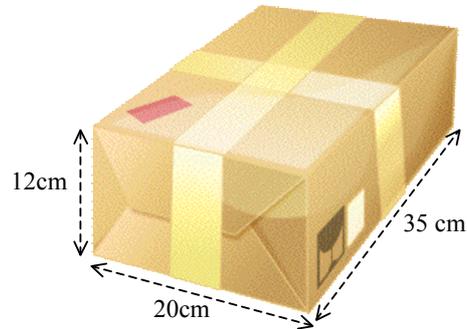


The trapezium is made up of a rectangle and two identical right-angled triangles, as shown in the diagram below.



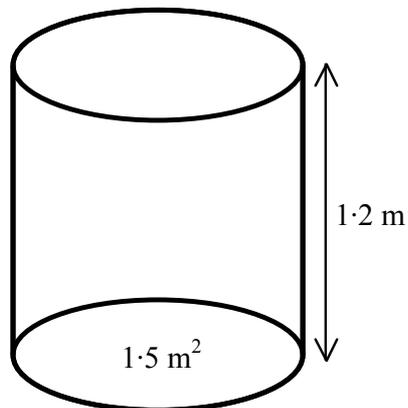
Find the area of the windscreen.

9. A parcel is in the shape of a cuboid.
It is 35 centimetres long, 20 centimetres wide and 12 centimetres high, as shown below.



Find the surface area of the cuboid shown.

10. I have a large container in my garden for collecting water.
The area of the base of the container is 1.5 square metres.
The height of the container is 1.2 metres.

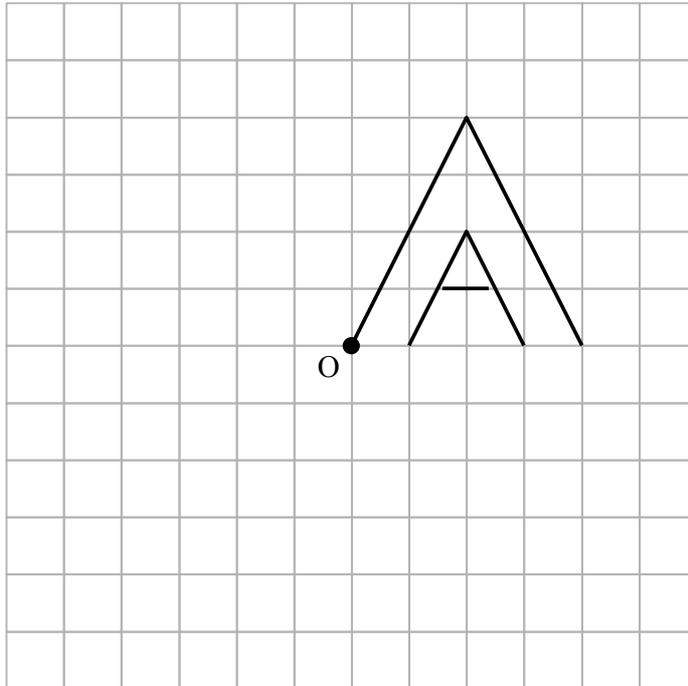


Calculate the volume of the container.

11. Andy's Autos have designed a new logo for their company.

Part of the design for the logo is shown below.

Complete this shape so that it has rotational symmetry of order 4, about O.



12. The number of visitors to an exhibition was recorded each day for two weeks.

The results are shown below.

77	93	87	71	90	98	100
78	84	91	97	88	102	107

Copy and complete the frequency table for these results.

Score	Tally	Frequency
70 – 79		
		Total =

13. Ten people were asked how long they had waited in a queue to get into an exhibition. The time, in minutes, was recorded and the results are shown below.

14 23 21 15 12
22 26 22 17 16

- (a) Calculate the mean time taken.
(b) Calculate the range.

The manager thought that these times were too long and introduced measures to cut the waiting times.

After this happened the mean waiting time was 15 minutes and the range 10.

- (c) Write two comments comparing the results before and after these were introduced.

14. A group of sixty students were asked what their favourite 'soap' was. The table below shows the results.

Soap	No. of students
Eastenders	15
Emmerdale	20
Corrie	25

Construct a pie chart to show this information.

To help you complete the pie chart, copy this table and fill in the blanks.

Soap	No. of pupils	Angle at centre
Eastenders	15	
Emmerdale	20	
Corrie	25	

Now complete the pie chart.

15. An octahedral die has eight faces numbered one to eight.
When it is thrown it comes to rest on one of its faces.
What is the probability that it comes to rest on a number greater than 3?



End of Question Paper