

18. [Measuring]

Skill 18.1 Estimating length.

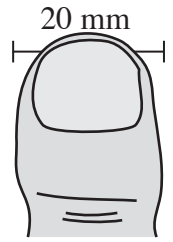
MM3.2 1 1 2 2 3 3 4 4
MM4.1 1 1 2 2 3 3 4 4

EITHER

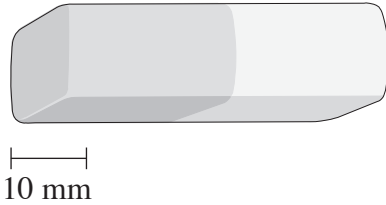
- Compare the length of the object to a known length.
Example: The line segments shown.

OR

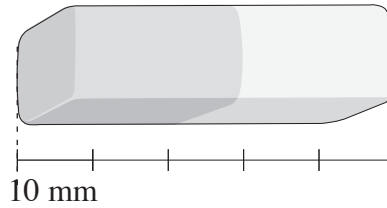
- Measure the length against an everyday object.
Example: Your thumb.



Q. Estimate the length of the eraser.

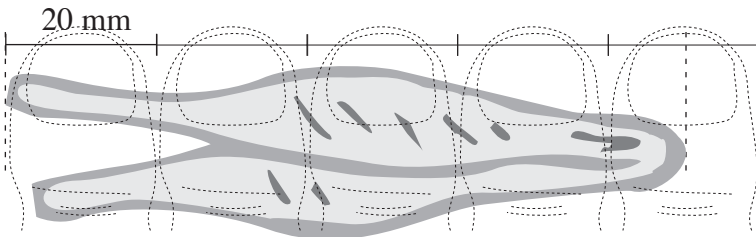


A. 50 mm



The eraser looks to be about five times the length of the 10 mm line. A reasonable estimate would be 50 mm.

a) Estimate the length of the tweezers.



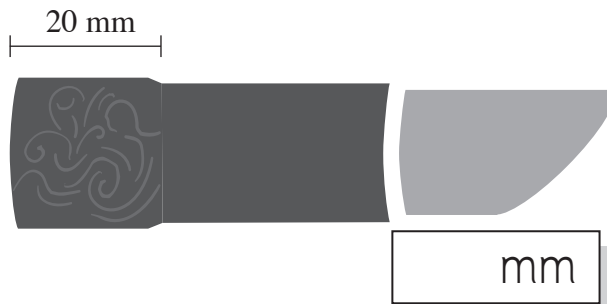
Accept 85 to 95 — 90 mm

b) Estimate the length of the postage stamp.



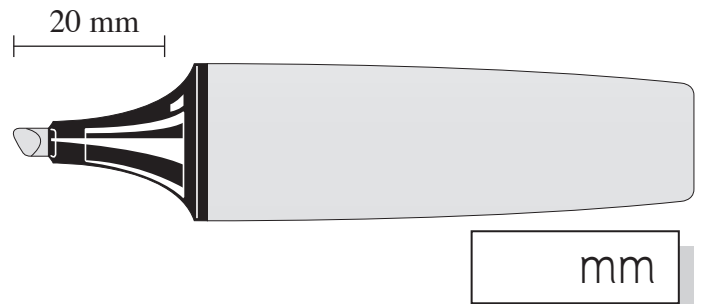
cm

c) Estimate the length of the lipstick.



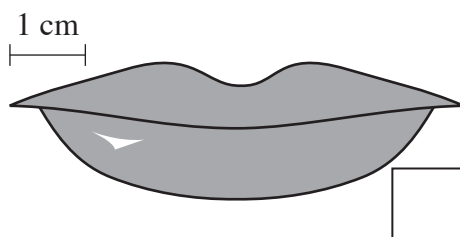
mm

d) Estimate the length of the hi-liter.



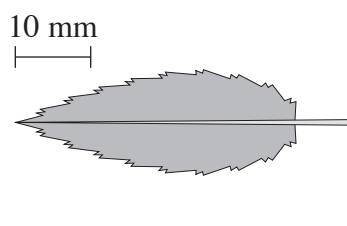
mm

e) Estimate the length of the lips.



cm

f) Estimate the length of the leaf.



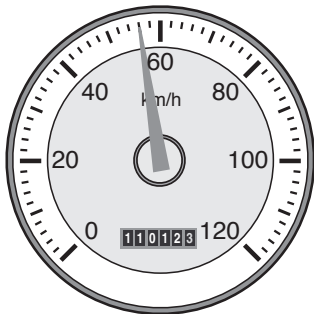
mm

- Determine the value of each mark and...
- EITHER
- Start at zero and count by that amount, pointing to each mark as you go.

OR

- Count on from a known point.

Q. At what speed is the car travelling?



A. **56 km/h**

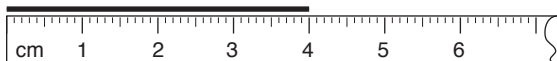
The darker calibrations mark every 20 km.

The arrow is between 40 and 60 but after 50 km.

The lighter calibrations mark every 2 km. The arrow is at 3 marks after 50. Counting 2, 4 to 6.

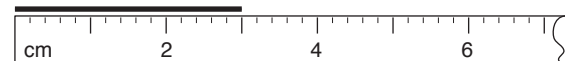
The car is travelling at 56 km/h.

a) Using the ruler, measure the length of the line.



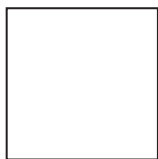
4 cm

b) Using the ruler, measure the length of the line.



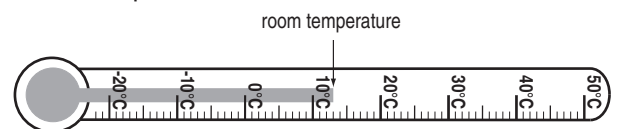
cm

c) Using a ruler, measure the length of a side of the square in millimetres.



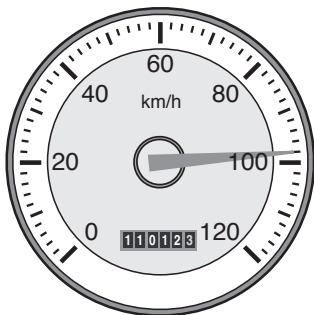
mm

d) According to the thermometer what is the temperature of the room?



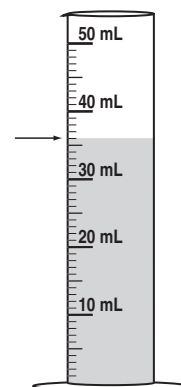
°C

e) At what speed is the car travelling?



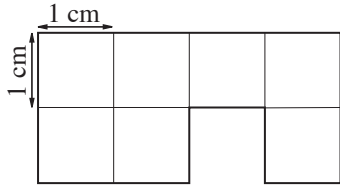
km/h

f) How much water is in the measuring cylinder?

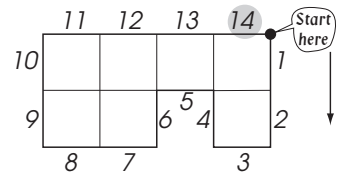


mL

Q. Find the perimeter of the shape.

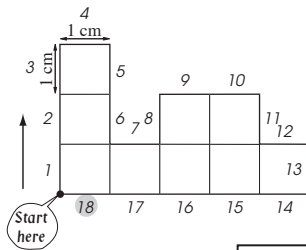
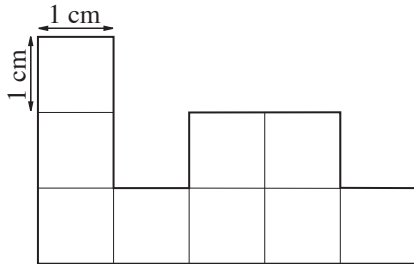


A. 14 cm



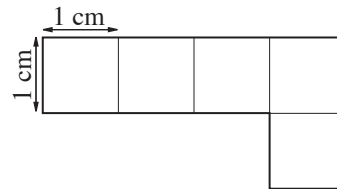
Each grid length measures 1 cm.
Mark a starting point.
Count the number of grid lengths around the outside of the shape.
There are 14 lengths or centimetres.

a) Find the perimeter of the shape.



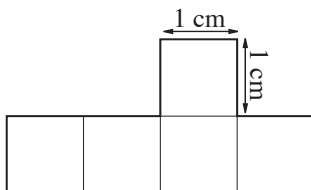
18 cm

b) Find the perimeter of the shape.



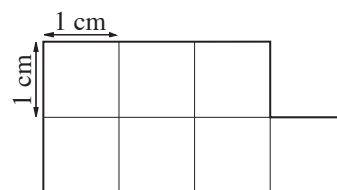
cm

c) Find the perimeter of the shape.



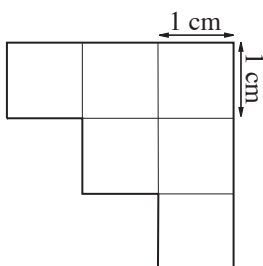
cm

d) Find the perimeter of the shape.



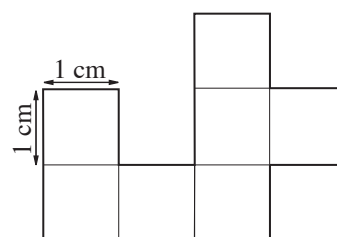
cm

e) Find the perimeter of the shape.



cm

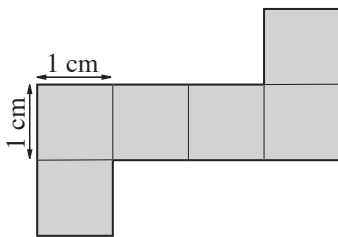
f) Find the perimeter of the shape.



cm

- Count the number of squares of a certain size that are needed to cover the shape.

Q. Find the area of this shape.



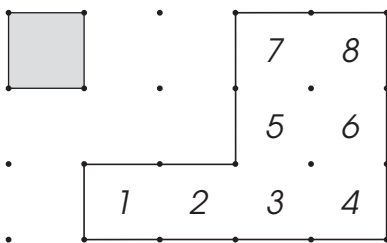
A. 6 cm^2 Each square is 1 cm on each side.

Count the squares that cover the surface inside the rectangle.

There are 6 squares, each with an area of 1 cm^2

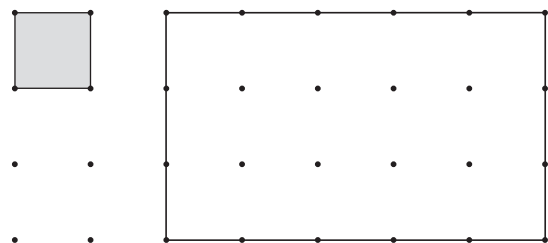
$$\begin{aligned} \text{Area} &= 6 \times 1 \text{ cm}^2 \\ &= 6 \text{ cm}^2 \end{aligned}$$

a) How many small squares are needed to cover the larger shape?

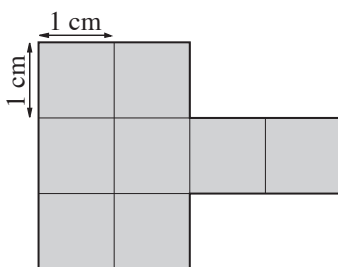


8

b) How many small squares are needed to cover the larger rectangle?

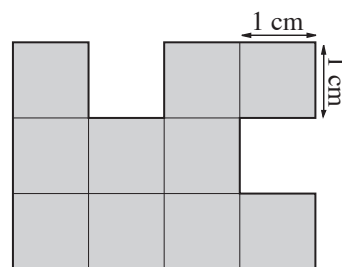


c) Find the area of this shape.



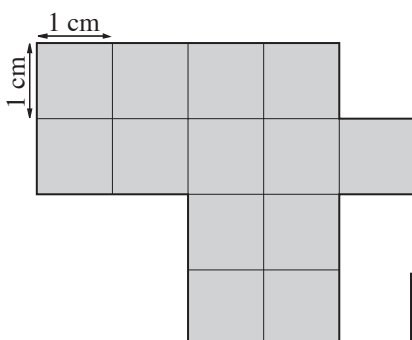
cm^2

d) Find the area of this shape.



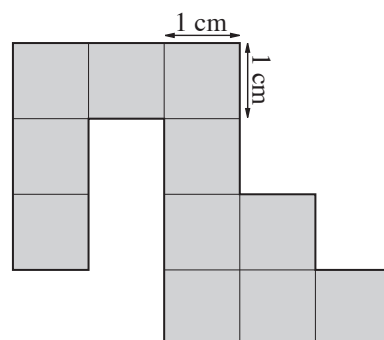
cm^2

e) Find the area of this shape.



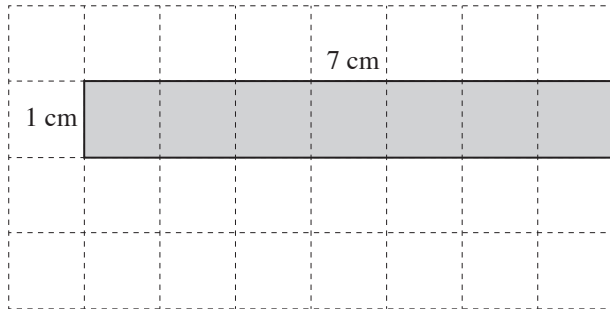
cm^2

f) Find the area of this shape.



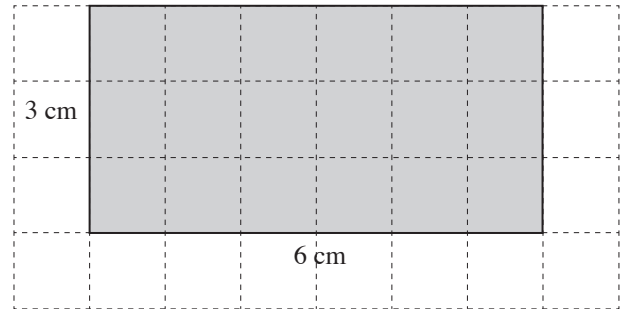
cm^2

g) Find the area of the shaded rectangle.



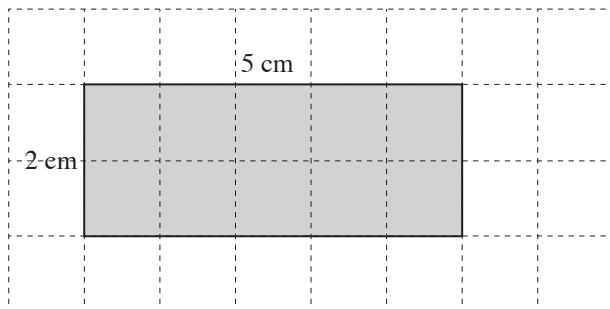
cm²

h) Find the area of the shaded rectangle.



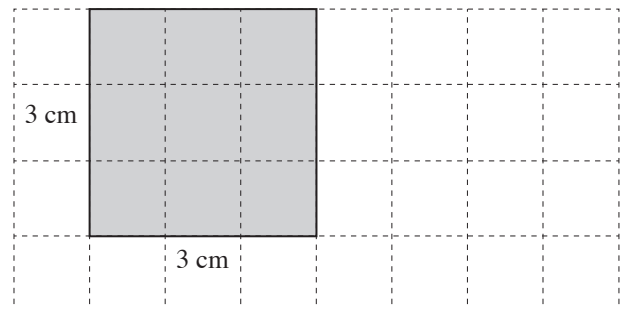
cm²

i) Find the area of the shaded rectangle.



cm²

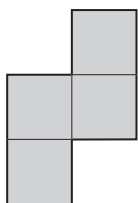
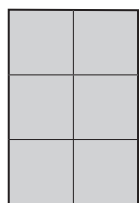
j) Find the area of the shaded square.



cm²

k) The shapes below have the same:

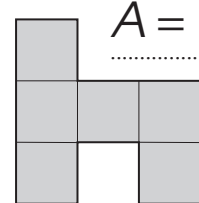
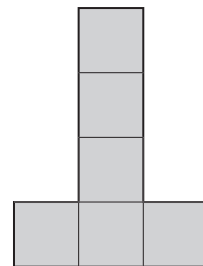
- A) perimeter and area
- B) perimeter
- C) area



$P =$
 $A =$

l) The shapes below have the same:

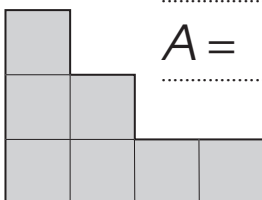
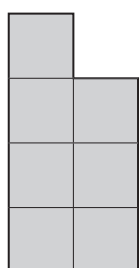
- A) perimeter and area
- B) perimeter
- C) area



$P =$
 $A =$

m) The shapes below have the same:

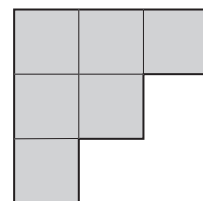
- A) perimeter and area
- B) perimeter
- C) area



$P =$
 $A =$

n) The shapes below have the same:

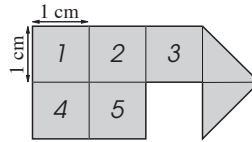
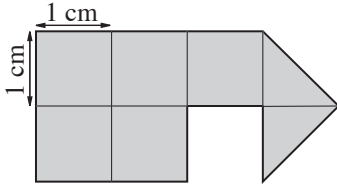
- A) perimeter and area
- B) perimeter
- C) area



$P =$
 $A =$

Q. Find the area of this shape.

A. 6 cm^2



First count the number of complete squares.
There are 5 complete squares.

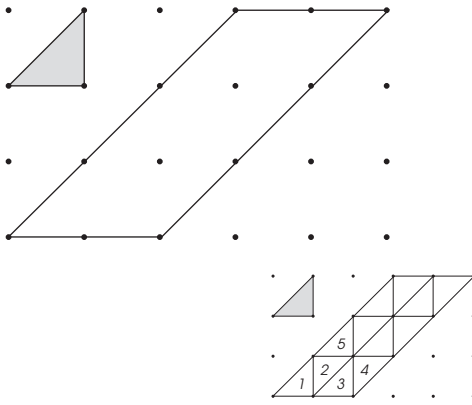
Then count the triangles.
Each triangle doubled forms 1 square.



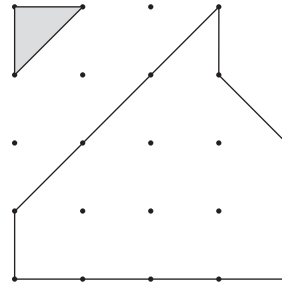
There are 2 triangles in the shape. Together they make 1 more square.

$$5 + 1 = 6 \text{ squares}$$

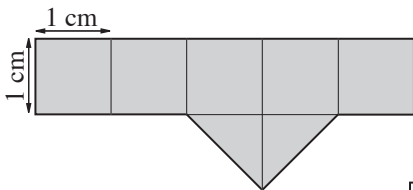
a) How many small triangles are needed to cover the parallelogram?



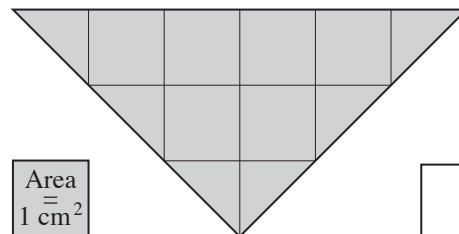
b) How many small triangles are needed to cover the shape?



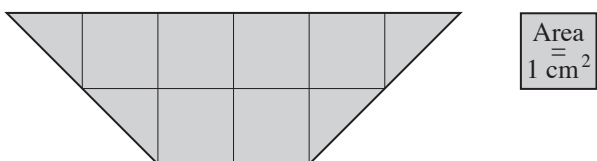
c) Find the area of this shape.



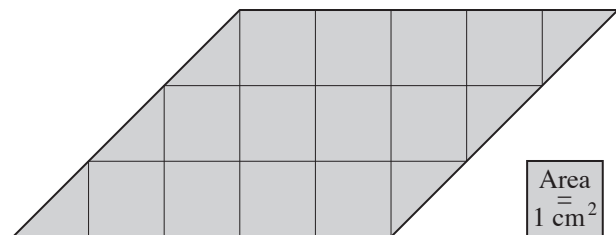
d) Find the area of this triangle.



e) Find the area of this trapezium.



f) Find the area of this parallelogram.

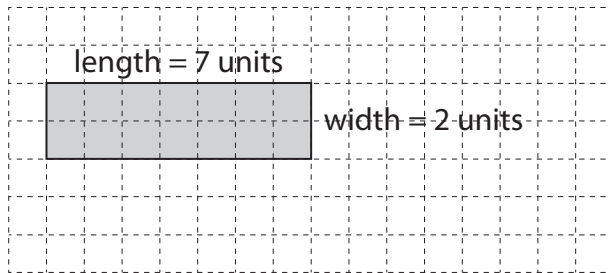


Skill 18.6 Calculating the area of a shape as a result of the enlargement of another shape.

MM3.2 11 22 33 44
MM4.1 11 22 33 44

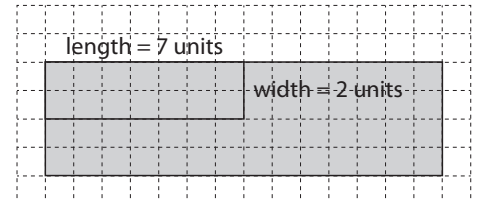
- Count the number of squares that make the area of both the original and the enlarged rectangles.
- Divide the enlarged area by the original area.

Q. Double the length and the width of this rectangle. How many times bigger is the area of the new rectangle compared to the original rectangle?

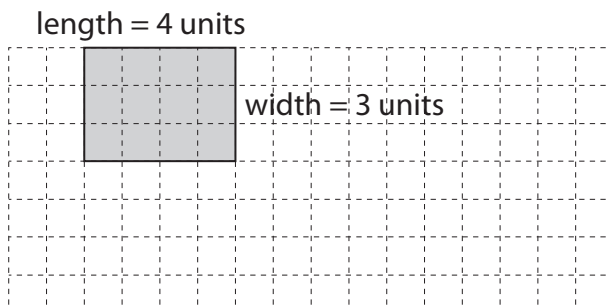


A. 4

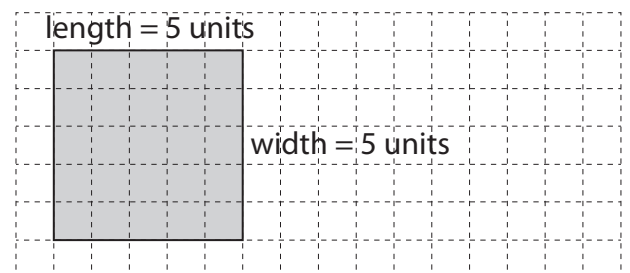
Original area = 14 square units
 Enlarged area = 56 square units
 Enlarged area \div original area =
 = $56 \div 14$
 = 4



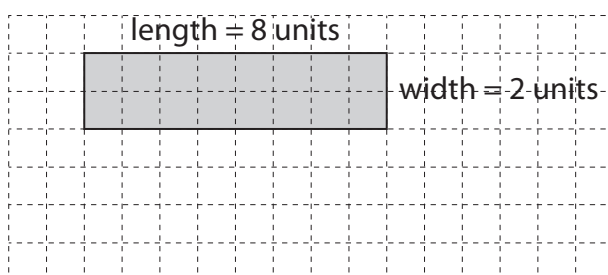
a) Double the length and the width of this rectangle. How many times bigger is the area of the new rectangle compared to the original rectangle?



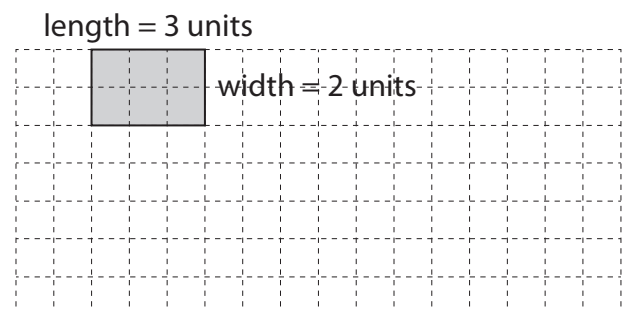
b) Double the length of this square. How many times bigger is the area of the new rectangle compared to the original square?



c) Triple the width of this rectangle. How many times bigger is the area of the new rectangle compared to the original rectangle?



d) Triple the length and the width of this rectangle. How many times bigger is the area of the new rectangle compared to the original rectangle?

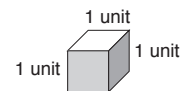


Skill 18.7 Describing volume of prisms by counting cubes.

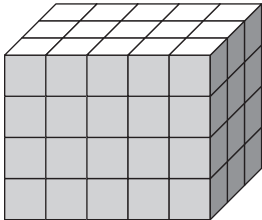
MM3.2 11 22 33 **44**
MM4.1 11 22 **33** 44

- Count the number of cubes needed to fill the top layer.
- Multiply this amount by the number of layers.

1 CUBIC UNIT



Q. How many cubes were used to make the prism?

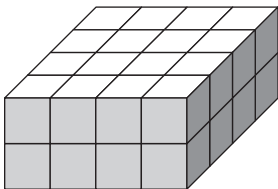


A. $3 \times 5 = 15$
 $15 \times 4 = 60$

First count the cubes in the top layer.
There are 3 rows of 5 cubes.

Then count the number of layers.
There are 4 layers of cubes.

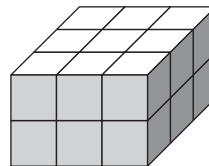
a) How many cubes were used to make the prism?



$4 \times 4 = 16$

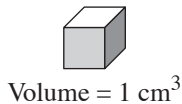
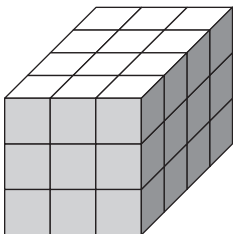
$16 \times 2 =$

b) How many cubes were used to make the prism?



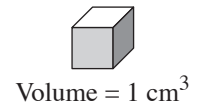
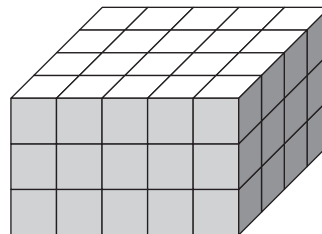
$\dots\dots\dots$

c) Count the cubes to find the volume of the prism.



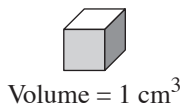
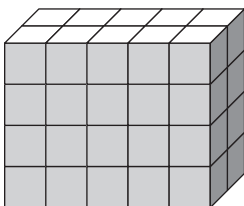
$\dots\dots\dots$

d) Count the cubes to find the volume of the prism.



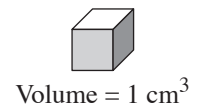
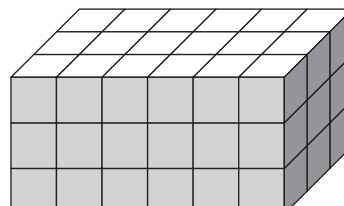
$\dots\dots\dots$

e) Count the cubes to find the volume of the prism.



$\dots\dots\dots$

f) Count the cubes to find the volume of the prism.

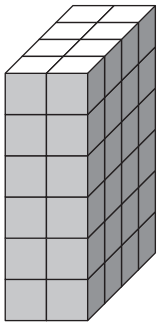


$\dots\dots\dots$

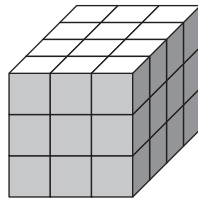
- Count the number of cubes in each prism.
Hint: Find a shortcut. Count the cubes in the top layer and multiply by the number of rows.
- Compare the number of cubes in each shape.

Q. Which prism has the greater volume?

A)

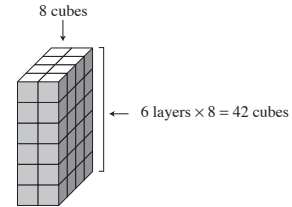


B)

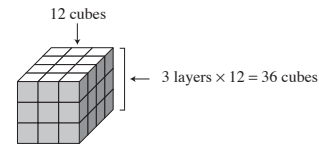


A. A

- A) Top layer = 8 cubes
Number of layers = 6
 $6 \times 8 = 48$ cubes



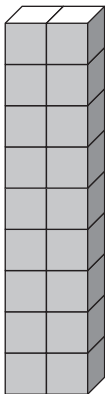
- B) Top layer = 12 cubes
Number of layers = 3 layers
 $3 \times 12 = 36$ cubes



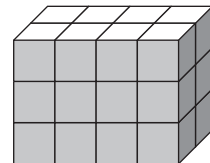
$48 > 36$ so the answer is A

a) Which prism has the greater volume?

A)

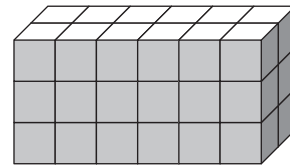


B)

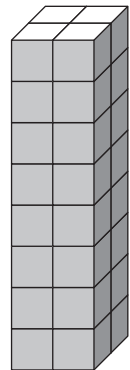


b) Which prism has the lesser volume?

A)

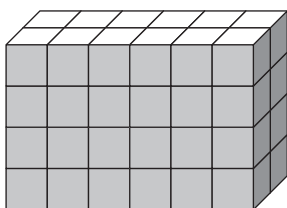


B)

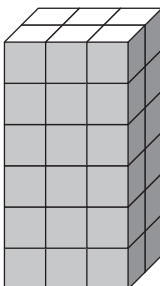


c) Which prism has the greater volume?

A)

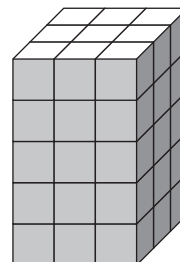


B)

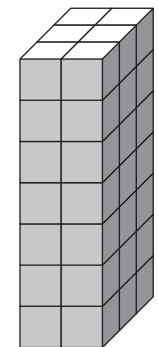


d) Which prism has the lesser volume?

A)

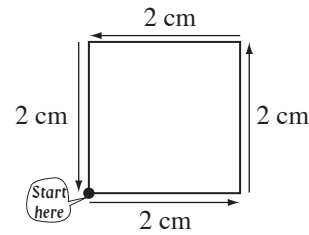
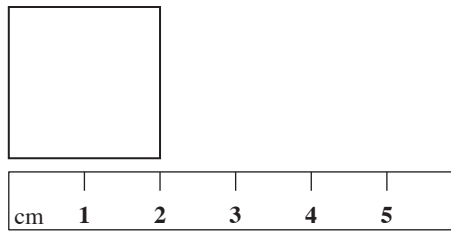


B)



- Measure the side lengths of the shape.
- Add the lengths of all sides.

Example: Side length = 2 cm, then the perimeter of the square = $2 + 2 + 2 + 2 = 8$ cm



Q. Using a ruler measure the side lengths of the rectangle in centimetres. What is the perimeter of the rectangle?

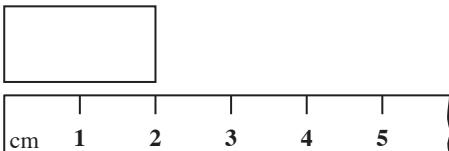


A. 5 cm
 5 cm
 2 cm
 $+ 2\text{ cm}$

 14 cm

A rectangle has opposite sides the same length.
 Measure the length of 1 side. (5 cm long)
 Measure the length of the adjacent side. (2 cm long)
 Add all four sides.
 The perimeter of the rectangle is 14 cm.

a) Using a ruler measure the side lengths of the rectangle in centimetres. What is the perimeter of the rectangle?



..... cm

b) Using a ruler measure the side lengths of the rectangle in centimetres. What is the perimeter of the rectangle?



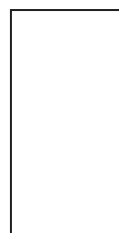
..... cm

c) Using a ruler measure the side lengths of the rectangle in centimetres. What is the perimeter of the rectangle?



..... cm

d) Using a ruler measure the side lengths of the rectangle in centimetres. What is the perimeter of the rectangle?



..... cm