OGUN DIGICLASS

CLASS: SECONDARY SCHOOL

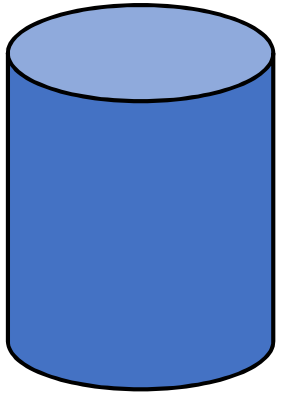
SUBJECT: MATHEMATICS

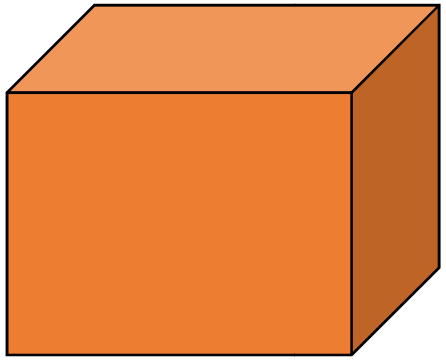
TOPIC: SOLID MENSURATION

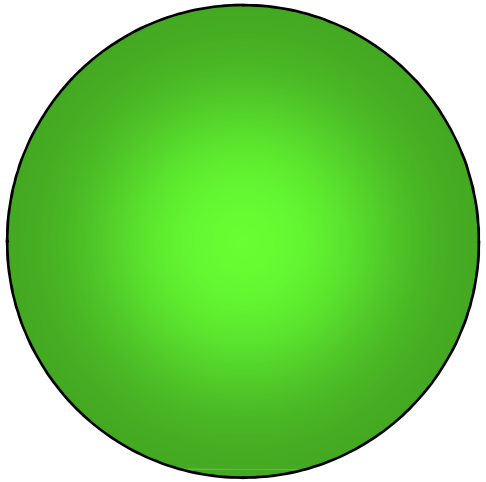
OBJECTIVES

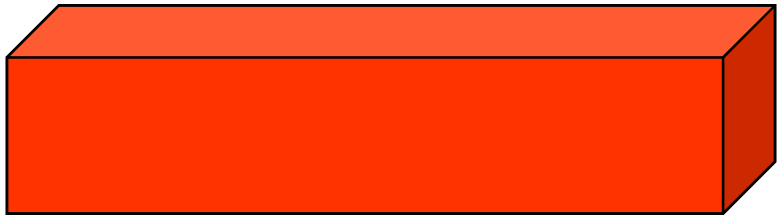
- List examples of solid mensuration with life examples
- State properties of solid mensuration
- Calculate the area and volume of solid mensuration

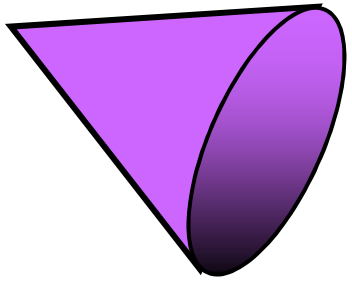
3D shapes







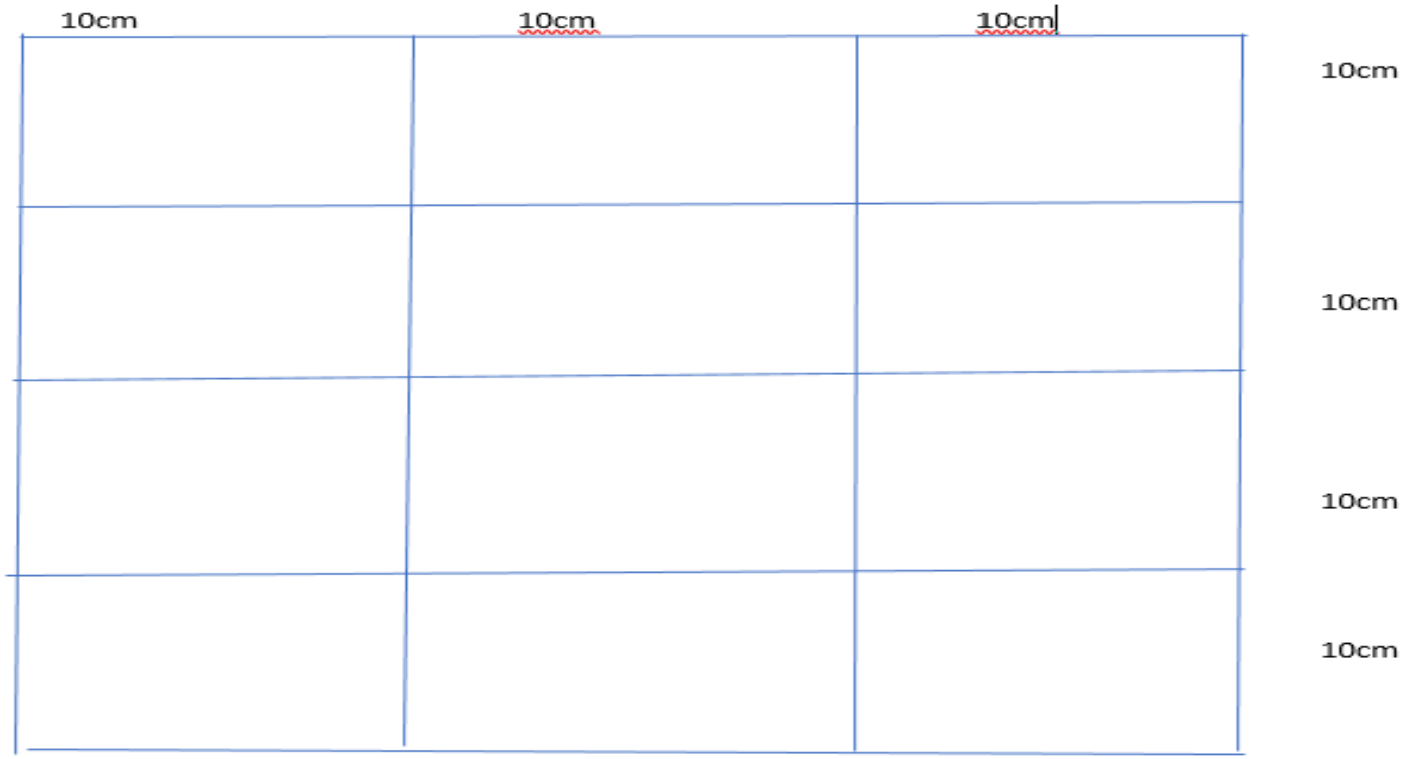




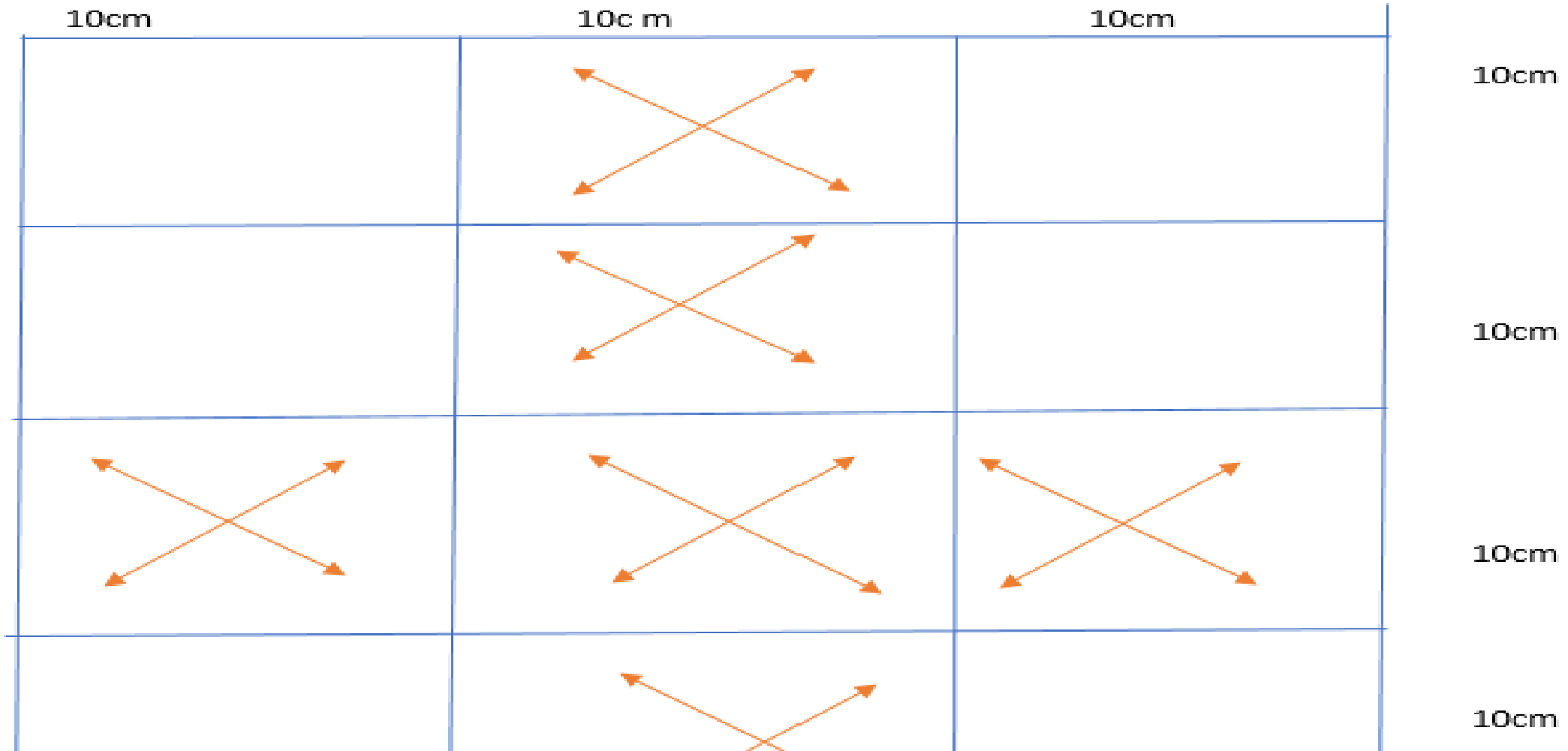
NET OF A SOLID MENSURATION

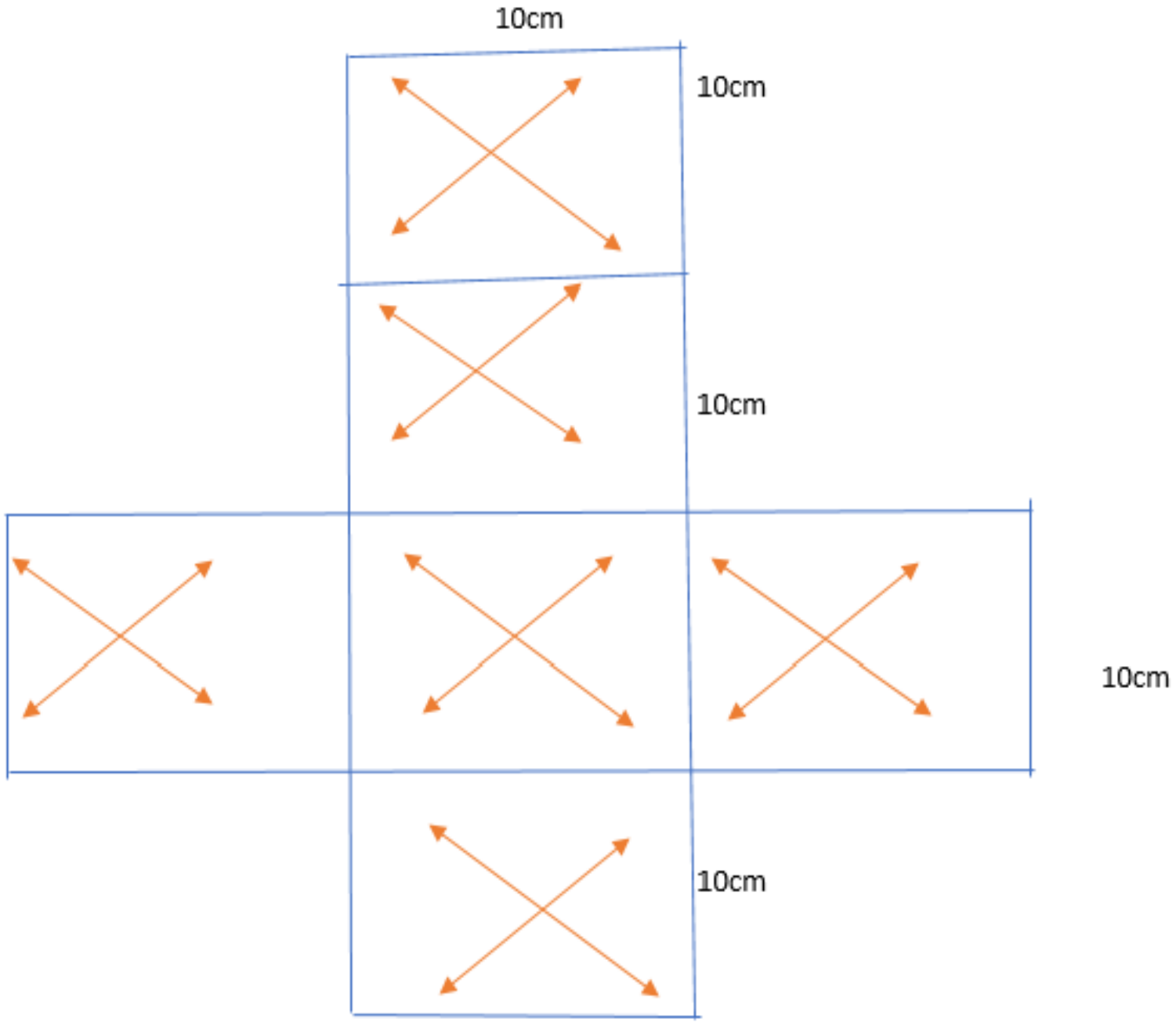
- CUBE

- A cube is a 3-dimensional shape that has six faces of equal dimension. This means that it has length, breadth (width) and height all of which are equal to each other



NET OF A CUBE




10cm
10cm
10cm
10cm
10cm
10cm

LET US TRY AND FOLD

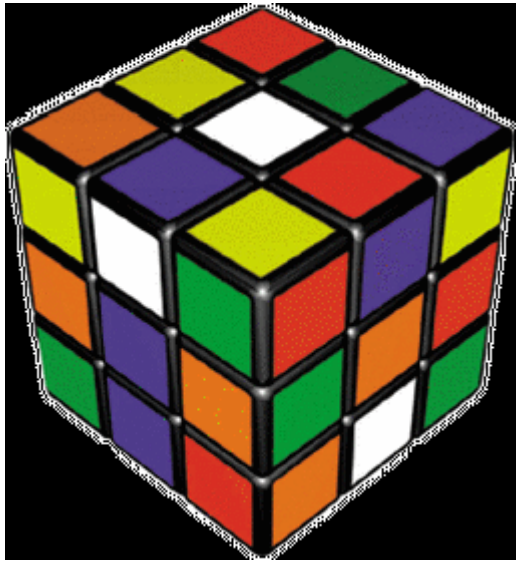
What shape am I?

- I have 6 flat square faces
- I have 12 straight edges
- I have 8 corners.

I am a .....?

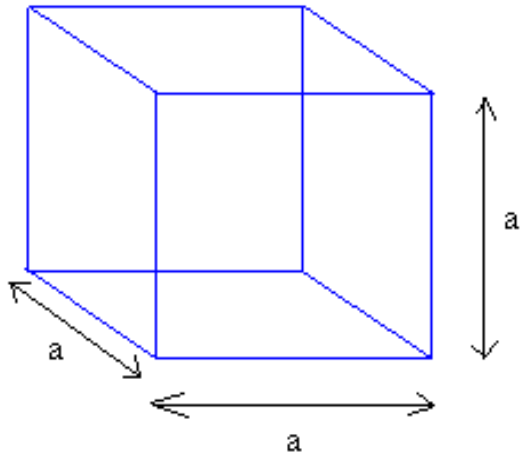
Fantastic!

I am a cube!



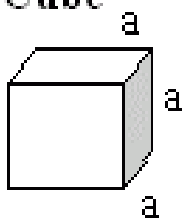
TOTAL SURFACE AREA OF CUBE

$V_{cube} = a^3 = a \times a \times a$



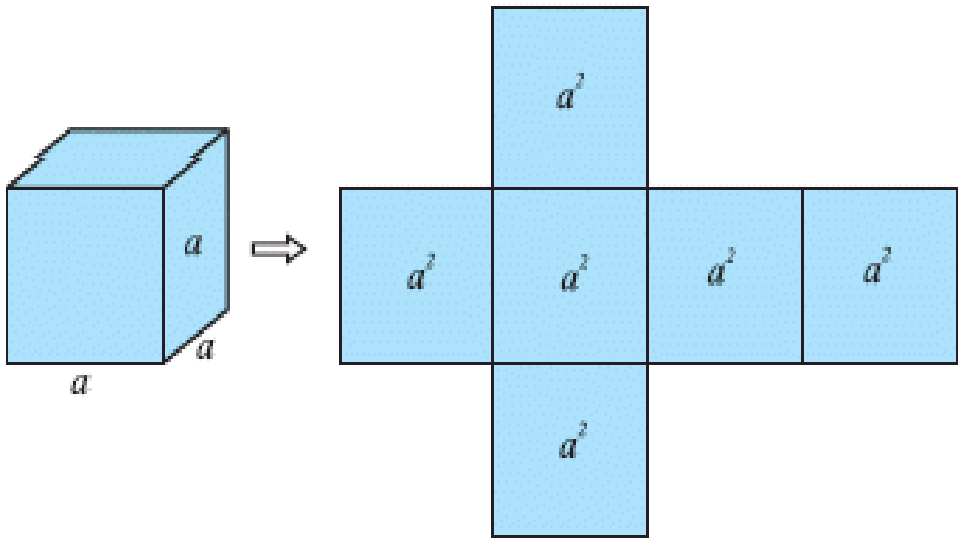
where a is the edge of the cube.

Cube



$\text{Surface Area} = 6a^2$

$\text{Lateral Surface Area} = 4a^2$



EXAMPLE CONT..

The side of a cube is 5cm. Find its total surface area and volume.

Solution:

Total surface area of cube = $6a^2$.

Where **a** is side.

Given that **a** = 5cm.

Total surface area of cube = 6×5^2

$= 6 \times 25$

$= 150cm^2$

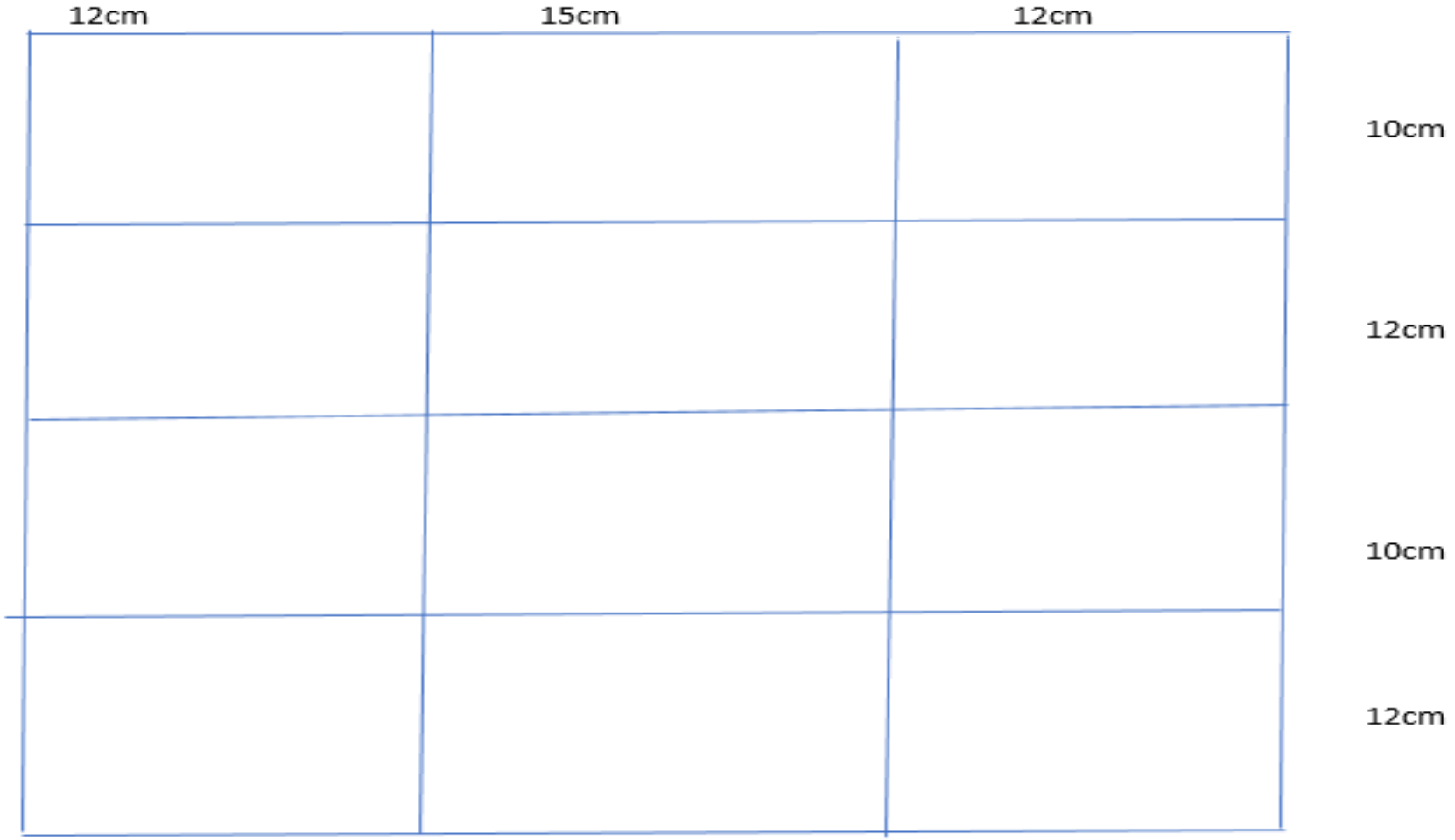
$V_{cube} = 5^3$

$V_{cube} = 5cm \times 5cm \times 5cm$

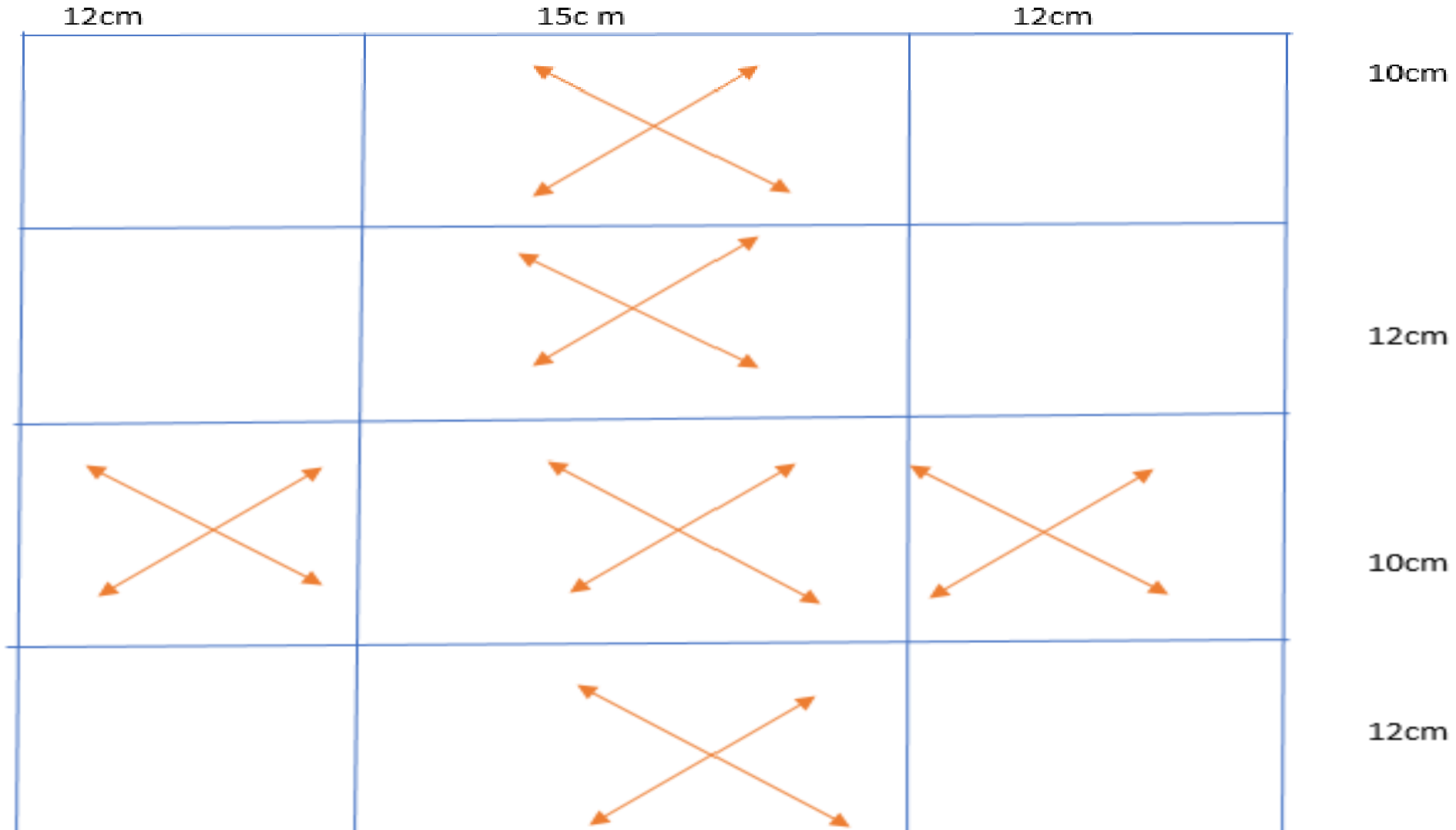
$V_{cube} = 125\ cm^3$

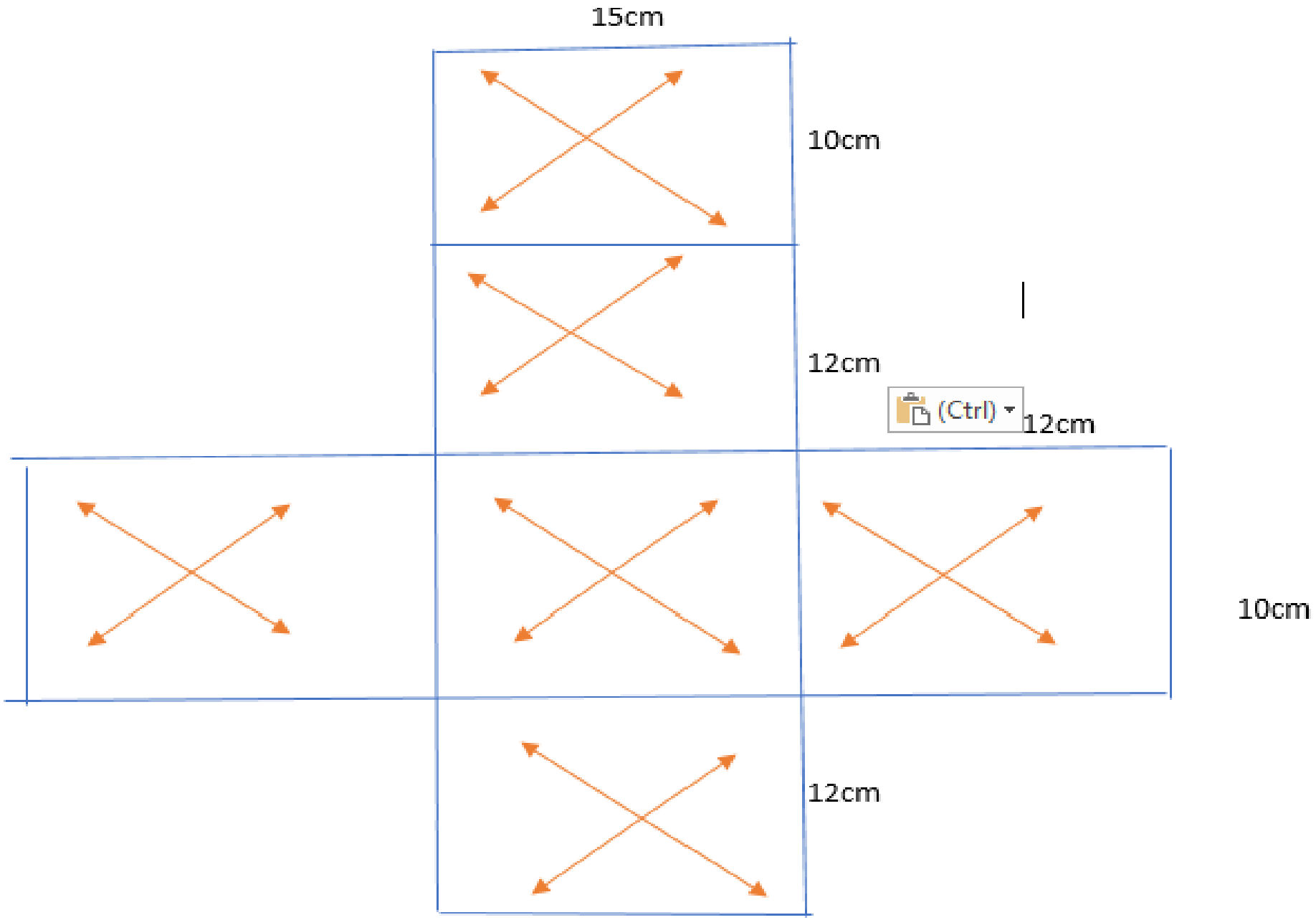
CUBOID

A Cuboids is a solid mensuration or 3-dimensional shape with rectangular base and side. It has six rectangular faces if all sides are closed



NET OF A CUBE



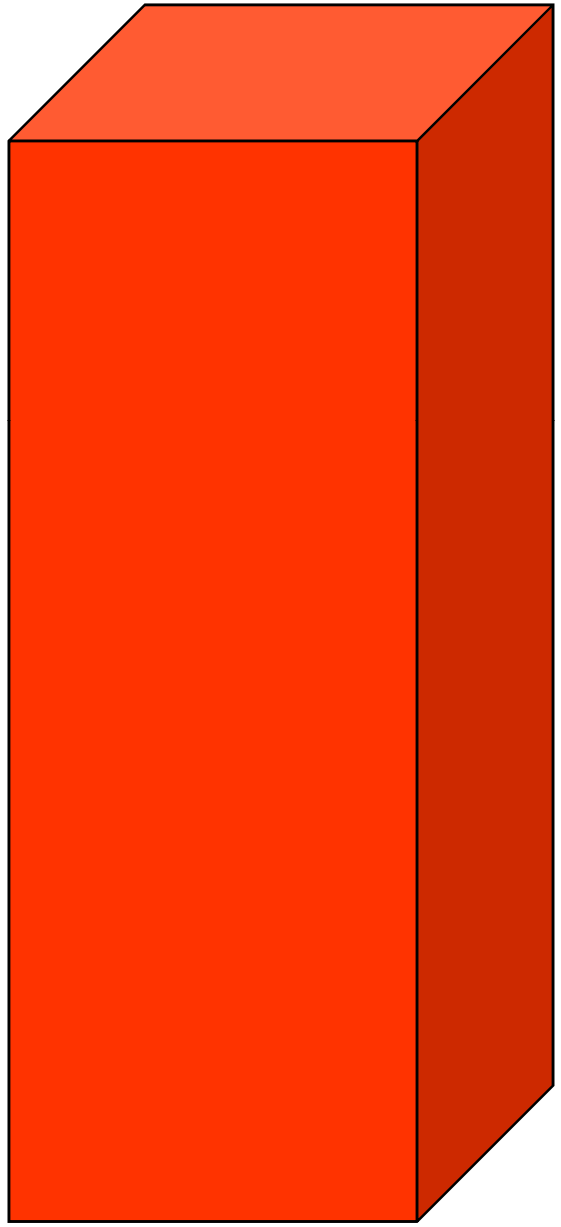

15cm
10cm
12cm
(Ctrl)
12cm
10cm
12cm

LET US TRY AND FOLD

What shape am I?

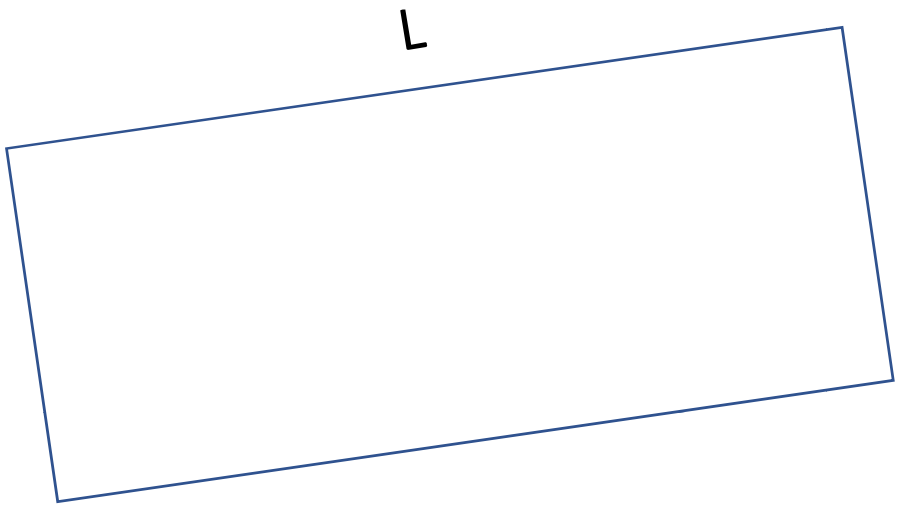
- I have 6 flat faces
- My faces are all rectangles (square or oblong)
- I have 12 straight edges and 8 corners.

I am a ……?

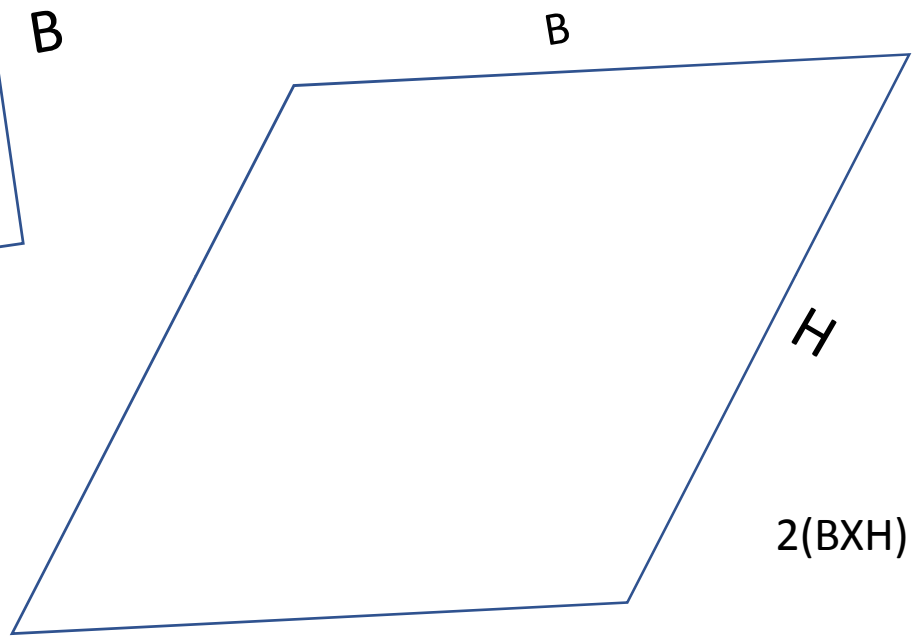


Brilliant!

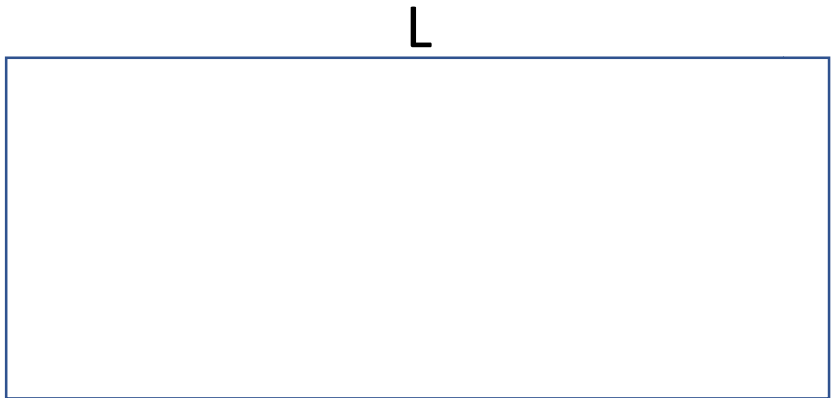
I am a cuboid!



2(LXB)



2(BXH)



2(LXH)

TOTAL SURFACE AREA AND VOLUME OF A CUBOID

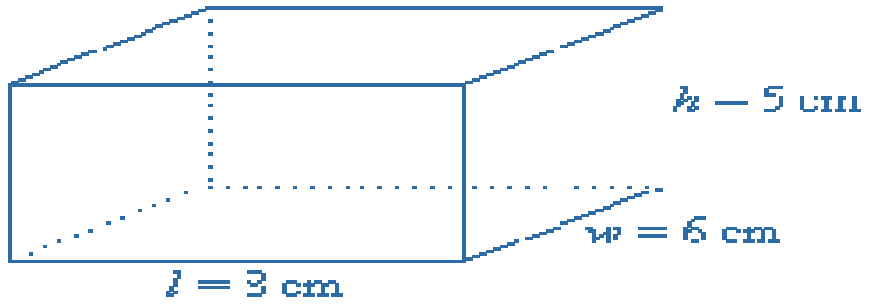
- TOTAL SURFACE AREA OF A CUBOID = 2(LB)+2(BH)+2(LH)

  =2(LB+BH+LH)

VOLUME OF CUBOID =LXBXH

TOTAL SURFACE AREA AND VOLUME OF A CUBOID

Find the total surface area of a cuboid with dimensions 8 cm by 6 cm by 5 cm.



$$
\begin{aligned}
TSA &= 2(lw + wh + hl) \\
&= 2(8\times6 + 6\times5 + 5\times8) \\
&= 2(48 + 30 + 40) \\
&= 2(118) \\
&= 236
\end{aligned}
$$

So, the total surface area is $148\ cm^2$.

V_{cuboid} = L x W x H

V_{cuboid} = 8cm x 6cm x 5cm

$V_{cuboid} = 240cm^3$

WASSCE 2004(N0. 3)PAST QUESTION

- A rectangle tank 60cm by 80cm by 100cm is half filled with water. how many litres of water is it holding

Solution

Volume of tank = 80 x 60 x 50

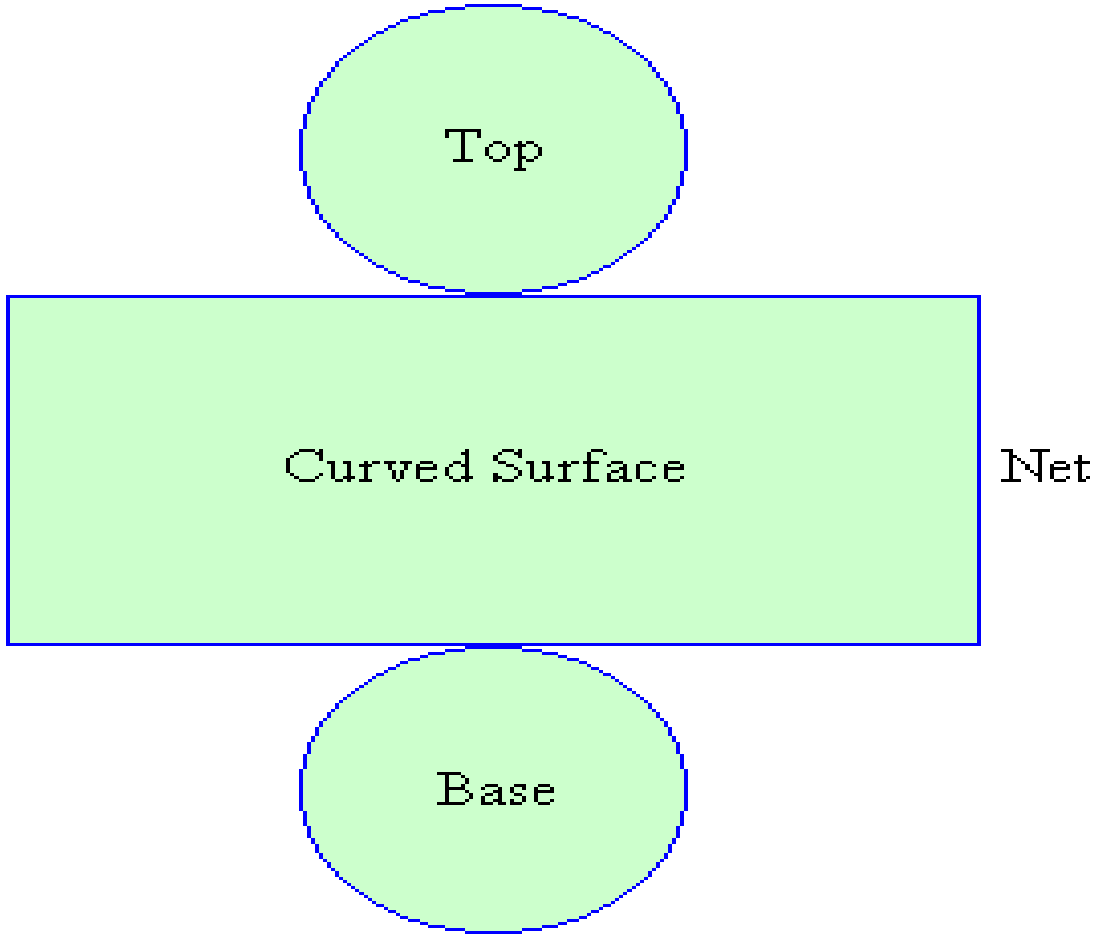
$$= 240{,}000\text{cm}^3$$

$$\text{Capacity} = \frac{240{,}000\text{cm}^3}{1{,}000\text{cm}^3} = 240\text{litres}$$

Therefore, the rectangular tank holds = 240litres

NOTE 1000cm^3 = 1LITRE

CYLINDER



LET US TRY AND FOLD

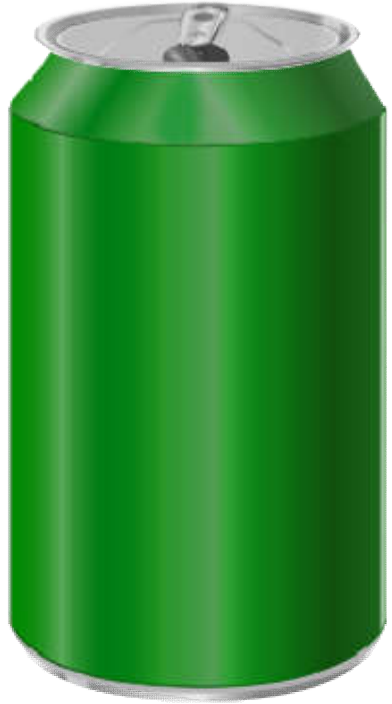
What shape am I?

- I have one curved face
- I have 2 flat circular faces.

I am a .....?

Well Done!

I am a cylinder



A cylinder is prism whose cross-section is a circle

a) Curved surface Area

=Base circumference x Height

$=2\pi rh$ square unit

a) Total Surface Area

= Areas of all the faces

I. When both top are closed

= area of base + area of top + curved surface area

$=\pi r^2 + \pi r^2 + 2\pi rh$

$=2\pi r^2 + 2\pi rh$

$=2\pi r(r + h)$ square unit

II. When one top is opened

=Area of base + Curved Surface Area

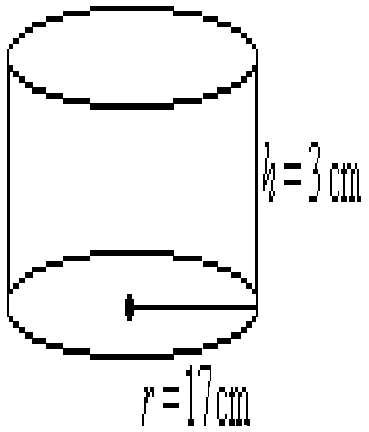
$= \pi r^2 + 2\pi rh$

$=\pi r(r + 2h)$ square units

EXAMPLE ON CYLINDER

Find the total surface area of a cylindrical tin of radius 17 cm and height 3 cm.

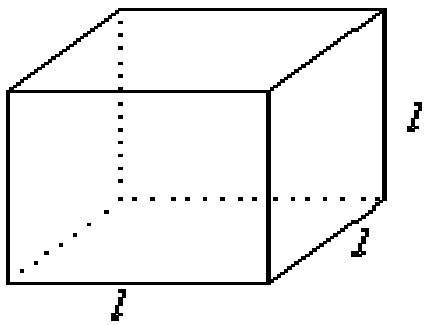
$$TSA = 2\pi r(r+h)$$
$$= 2\times 3.142\times 17(17+3) \qquad \{BODMAS\}$$
$$= 2\times 3.142\times 17\times 20$$
$$= 2136.56$$



So, the total surface area is $2136.56\ cm^2$.

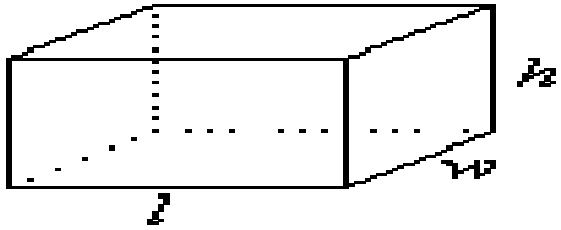
SUMMARY

Cube



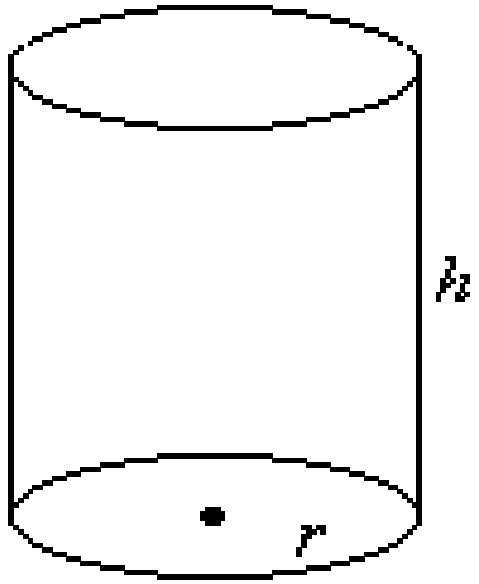
$$TSA = 6l^2$$

Cuboid



$$TSA = 2(lw + wh + hl)$$

Cylinder



$$CSA = 2\pi rh$$

$$TSA = 2\pi r(r + h)$$

ASSIGNMENT FROM WASSCE PAST QUESTIONS

- 1995(OBJ NO. 25 AND 26)
- 2002(THEORY NO. 8)
- 2005(OBJ. NO. 39)
- 2007(THEORY NO. 8)

KEEP SAFE AND STAY HEALTHY