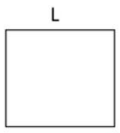
Topic 12: Area/Volume

1) The Formulae: (Note the ones with an asterisk next to them are **NOT** in the Tables)

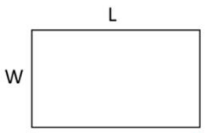
Square:



Area = L^2 *

Per = 4L *

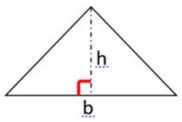
Rectangle:



Area = L x W *

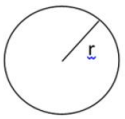
Per = 2L + 2W *

Triangle:



Area = ½ b x h

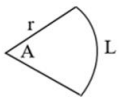
Circle:



Area = πr^2

Circum = $2\pi r$

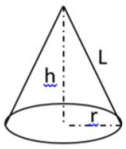
Sector:



Area = $\frac{A}{360^\circ}$ X πr^2

L = $\frac{A}{360^\circ}$ X $2\pi r$

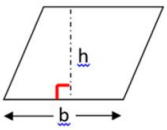
Cone:



Vol = $\frac{1}{3}\pi r^2 h$

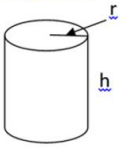
CSA = $\pi r L$

Parallelogram:



Area = b x h

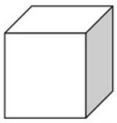
Cylinder:



Vol = $\pi r^2 h$

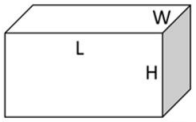
CSA = $2\pi rh$

Cube / Cuboid:



Vol = L^3 *

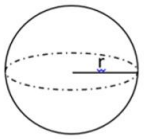
TSA = $6L^2$ *



Vol = L x W x H *

TSA = 2LW + 2WH + 2HL *

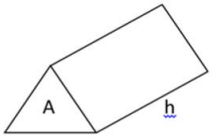
Sphere:



Vol = $\frac{4}{3}\pi r^3$

CSA = $4\pi r^2$

Prism:



Vol = Area A x h

2) Solving Problems:

a) Tips for solving Area/Volume problems:

1. Draw a good-sized diagram.
2. Label and fill in all information given.
3. Identify the shapes in the question.
4. Write down relevant formulae for those shapes.

b) Recasting/Remoulding:

- Melting down shapes and making new shapes.

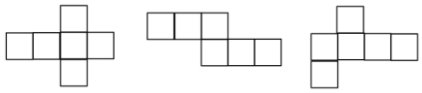
Vol of Old Shape = Vol of New Shape(s)

3) Nets:

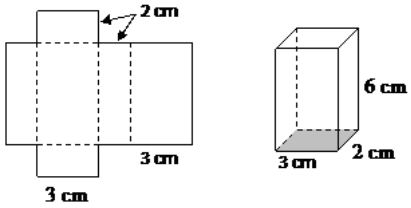
➢ The **net**, of a particular shape, is a flat surface that, when folded, can be made into that shape.

a) Nets of Cubes:

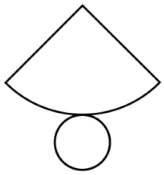
➢ There are 11 nets for a cube. Some are shown below.



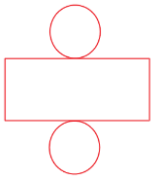
b) Net of a Cuboid:



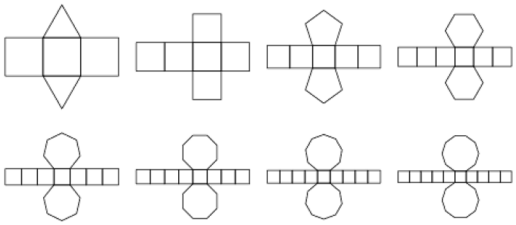
c) Net of a Cone:



d) Net of a Cylinder:



d) Nets for some Polygonal Prisms:



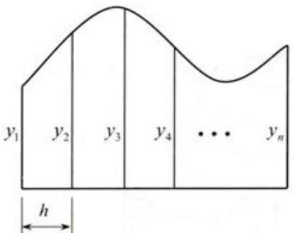
4) Trapezoidal Rule:

Note:

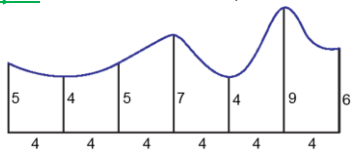
➢ Used to **estimate** the area of **irregular** shapes.

$$A \approx \frac{h}{2}[y_1 + y_n + 2(y_2 + y_3 + \cdots y_{n-1})]$$

1st height — Last height — Other heights



Example: Find an estimate of the area below:



$$A \approx \frac{h}{2}[y_1 + y_n + 2(y_2 + y_3 + \cdots y_{n-1})]$$

$$A \approx \frac{4}{2}[5 + 6 + 2(4 + 5 + 7 + 4 + 9)]$$

$$A \approx 2[69] = 138 \text{ units}^2$$