# Mathematical Formulas and Units of Measurement for Classes 7 and 8

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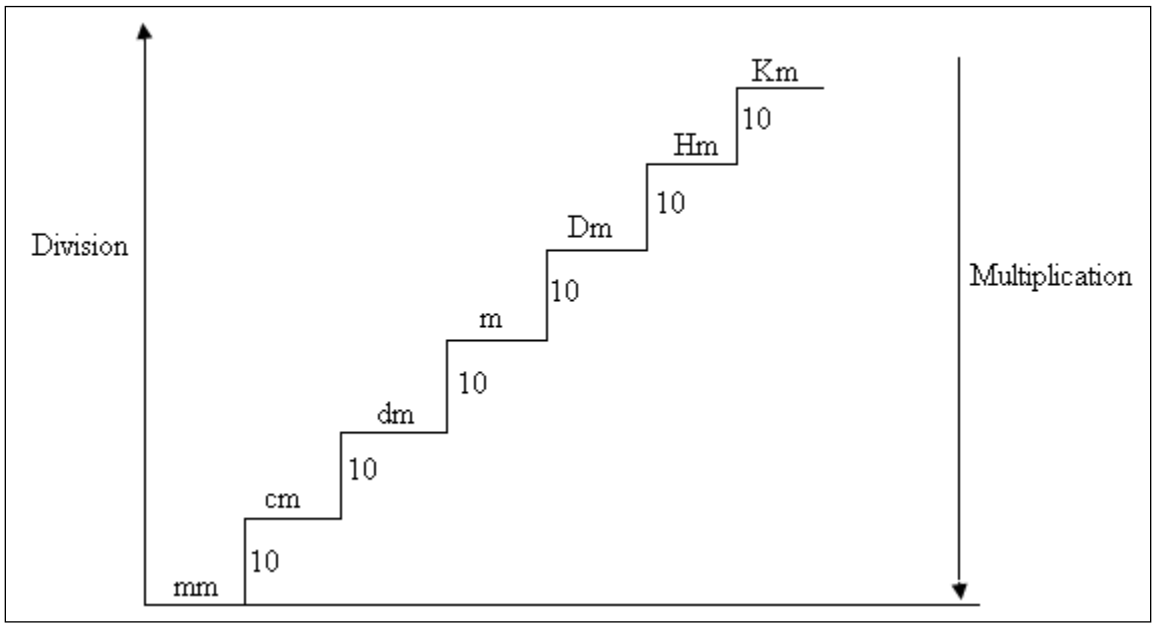
Mathematical formulas are important components in teaching and learning mathematics. These formulas provide a computation roadmap. In order to assist both teachers and learners, this note provides general mathematical formula and common units of measurements meant for classes 7 and 8. The formulas are expected to help students to solve questions easily and in a more effective way.

## Length

The units of length that are used include the following:

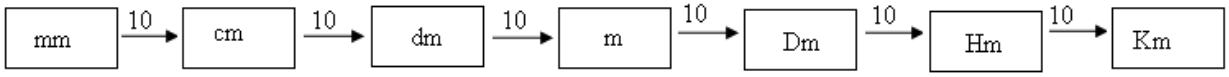
- millimetre (mm)
- centimetre (cm)
- decimetre (dm)
- Metre (m)
- Dekametre (Dm)
- Hectometre (Hm)
- Kilometre (Km)



From the illustration:

- 10mm = 1cm
- 10cm = 1dm
- 10dm = 1m
- 10m = 1 Dm
- 10Dm = 1Hm
- 10 Hm = 1Km

The relationship between the units of lengths may be clearly seen if the units are written with a 10 between them.




So to find how many small units are equivalent to another, multiply the number of tens between the units, hence:

- Km 1
- Hm 10
- Dm 100
- M 1000
- dm 10000
- cm 100000
- mm 1000000

**Mass**

- 1000 g = 1Kg
- 1000 Kg = 1Tonne
- 1000000 g = 1Tonne

**Volume and Capacity**

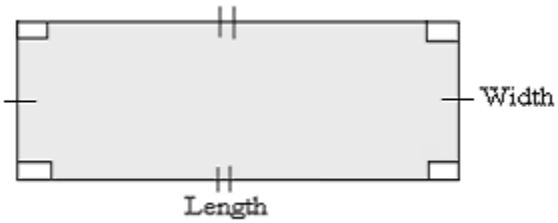
- 1 $cm^3$ = 1 Ml (millilitre)
- 1000 $cm^3$ = 1 L (litre)
- 100 $cm^3$ = 1 dl (decilitre)
- 1 $m^3$ = 1000 litre
- 1000000 $cm^3$ = 1 $m^3$
- 10 dl = 1 Litre
- 1000ml = 1 Litre

**Time**

- 60 Seconds = 1 Minute
- 60 Minutes = 1Hour
- 3600 Seconds = 1 Hour
- 24 Hours = 1 day
- 7 Days = 1 Week

**Area**

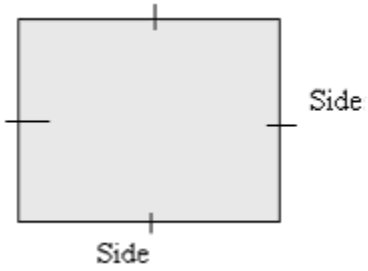
**a) Rectangle**




Area = Length x Width

A = L X W

**b) Square**

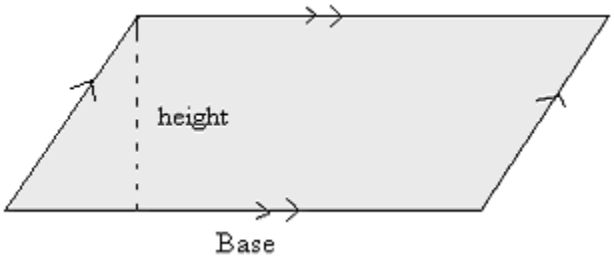



Area = Side x Side

A = S x S

A = $S^2$

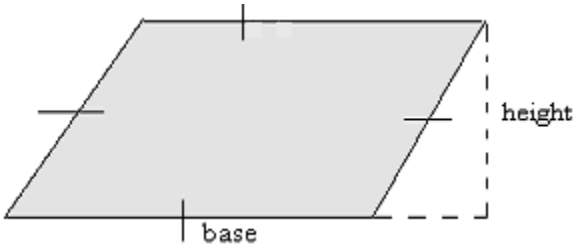
**c) Parallelogram**




A = base x Height

A = b x h

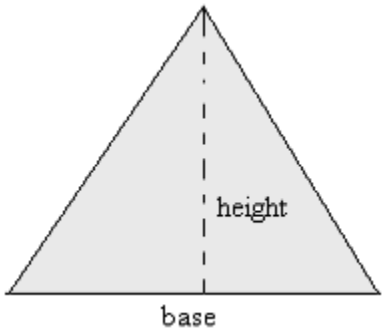
**d) Rhombus**




Area = base x height

A = b x h

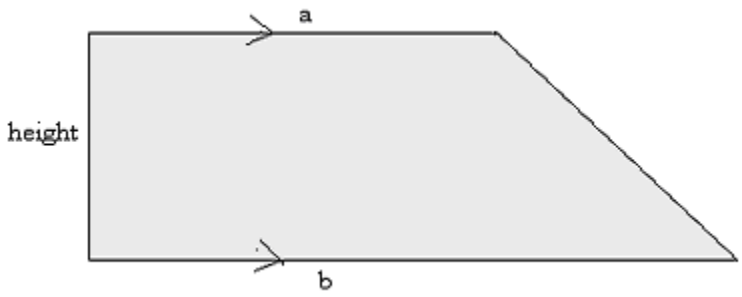
**e) Triangle**




Area = $\frac{1}{2}$ base x height

A = $\frac{1}{2}$ b x h

**f) Trapezium**



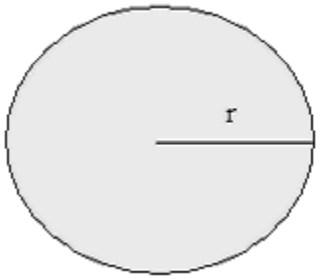

Area = $\frac{1}{2}$ x sum of parallel lines x height

A = $\frac{1}{2}$ (a + b) x h

A = $\frac{h}{2}$ (a + b)

**g) Circle, half circle, quarter circle**

***i) Circle***




Area = Π x radius x radius

A = Π x r x r

A = $\Pi r^2$

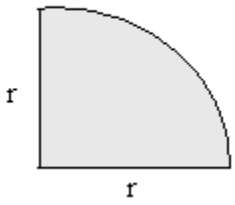
***ii) Half circle***

Area = Area of a full circle ÷ 2

A = $\frac{\Pi r^2}{2}$

A = $\frac{1}{2} \Pi r^2$

***iii) Quarter circle***




A = Area of the full circle ÷ 4

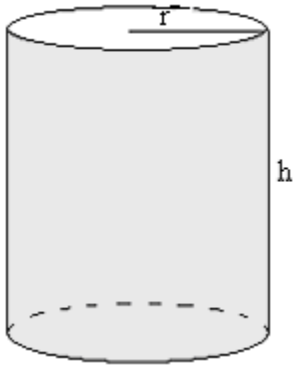
A = $\Pi r^2 \div 4$

A = $\frac{1}{4}\Pi r^2$

**Note:** Π = 22 or 3.14 or

**7**

**Surface Area**




**a) Cylinder**

T.S.A = Area of circular ends + area of the curved surface

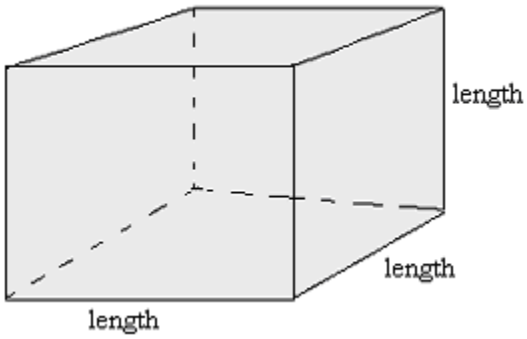
=

$\mathbf{2\pi r^2}$ + Πdh ( if closed both ends)

T.S.A = $\Pi r^2$ + Πdh (if open one end )

T.S.A = Πdh (if open both ends/pipe)

**b) Cube**




T.S.A = Total area of all the six faces

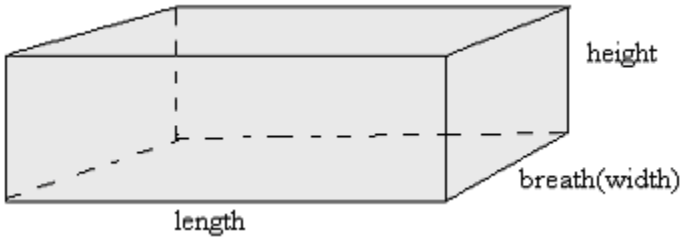
= 6 x L x L

= $6L^2$ (if closed)

or

= $5L^2$ (if open one end)

**c) Cuboid**



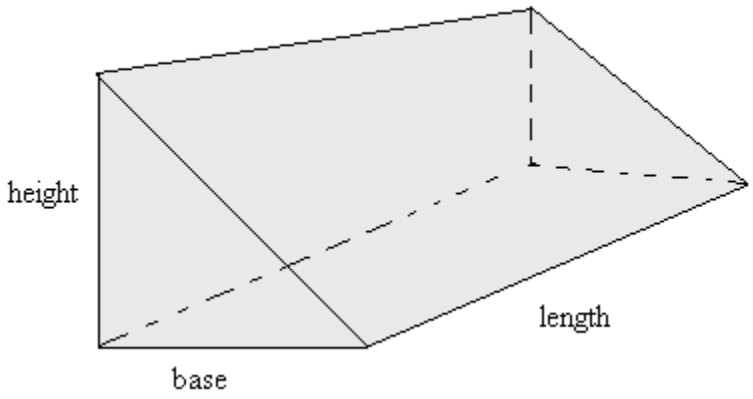

T.S.A = Total area for the six faces

= 2 (L x w) + 2 (L x h) + 2 (w x h)

or

= (L x w) + 2 (L x h) + 2(w x h) ( if open on top)

**d) Triangular prism**




T.S.A = Area of all the 5 faces of the prism

**Volume of cylinder and rectangular shapes**

**a) Cylinder**

Volume = Base area x height

= $\Pi r^2$ x height

= $\Pi r^2 h$

**b) Rectangular shape**

Volume = Base area x height

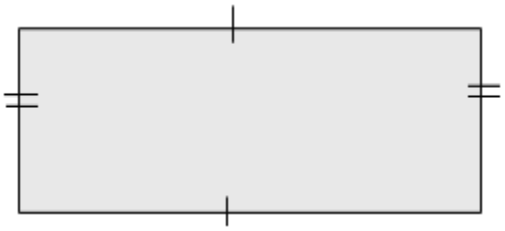
V = L x w x h

**Note:** Depending on the cross-section, the volume of any shape / solid is given by.

V = Area of cross-section x height/length

**Perimeter**

**a) Rectangle**

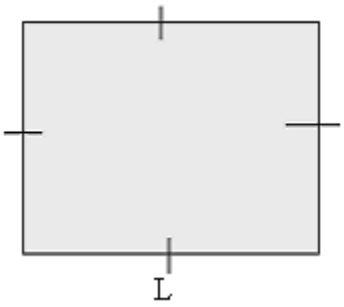


P = Length + Length + Width + Width

= L + L + W + W

= 2L + 2W or 2(L + W)

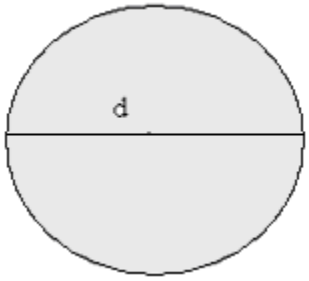
**b) Square**




P = L + L + L + L

= 4L

**c) Circle**

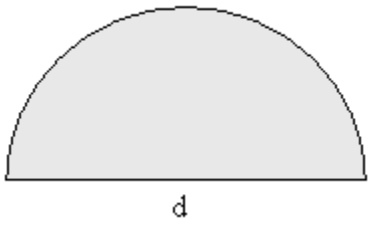



C = Π x diameter

= Πd or 2Πr

**Note:** Perimeter of a full circle is called *circumference*

**d) Half a circle**




Perimeter = circumference + diameter

$P = \frac{1}{2} \Pi d + d$

**Note:** For triangles and irregular shapes, JUST ADD THE DISTANCE ALL ROUND.

**Expressing area of large shapes**

***a) Hectare*** – A shape that measures 100m by 100m

Therefore 1ha = (100 x 100) $m^2$

1 ha = 10000$m^2$

***b) Are*** – a piece / shape that measures 10m by 10m

Therefore 1 are = 10 x 10

1 are = 100$m^2$

Hence:

1 ha = 10000$m^2$

1are = 100$m^2$

1ha = 100ares