CRACK ACADEMY

……Driven by Quality, Powered by Professionals

UNIT CONVERSIONS & FORMULAS

METRIC SYSTEM PREFIXES

Yotta = 10^{24} Symbol: Y
Zetta = 10^{21} Symbol: Z
Exa = 10^{18} Symbol: E
Peta = 10^{15} Symbol: P
Tera = 10^{12} Symbol: T
Giga = 10^{9} Symbol: G
Mega = 10^{6} Symbol: M
Kilo = 10^{3} Symbol: k
Hecto = 10^{2} Symbol: h
Deca = 10^{1} Symbol: da
Deci = 10^{-1} Symbol: d
Centi = 10^{-2} Symbol: c
Milli = 10^{-3} Symbol: m
Micro = 10^{-6} Symbol: μ
Nano = 10^{-9} Symbol: n
Pico = 10^{-12} Symbol: p
Femto = 10^{-15} Symbol: f
Atto = 10^{-18} Symbol: a
Zepto = 10^{-21} Symbol: z
Yocto = 10^{-24} Symbol: y

UNITS OF LENGTH IN THE METRIC SYSTEM

1,000 millimeters (mm) = 1 meter

100 centimeters (cm) = 1 meter

10 decimeters (dm) = 1 meter

1 decameter (dam) = 10 meters

1 hectometer (hm) = 100 meters

1 kilometer (km) = 1000 meters

UNITS OF WEIGHT IN THE METRIC SYSTEM

1 gram = 1,000 milligrams (mg)

1 gram = 100 centigrams (cg)

1 kilogram (kg) = 1,000 grams

1 metric ton (t) = 1,000 kilograms

UNITS OF AREA IN THE METRIC SYSTEM

1 cm^2 = 100 mm^2

1 dm^2 = 100 cm^2

1 m^2 = 100 dm^2

1 Ares (a) = 100 m^2

1 hectare = 100 Ares (a)

1 acre = 4046.86 m^2

1 hectare = 2.47105 acre

UNITS OF VOLUME IN THE METRIC SYSTEM

1 cc = 1 cm^3

1 milliliter (mL) = 1 cm^3

1 liter (L) = 1,000 milliliters (mL)

1 m^3 = 1000 liters

1 hectoliter (hL) = 100 liters

1 kiloliter (kL) = 1,000 liters (L)

UNITS OF TIME IN SI SYSTEMS

1 millisecond = 1,000 microseconds

1 second =1,000 milliseconds

1 minute = 60 seconds

1 hour = 60 minutes

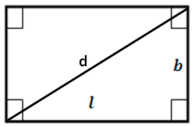
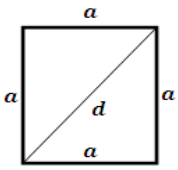
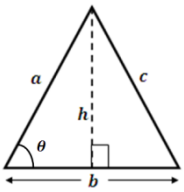
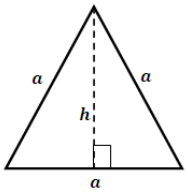
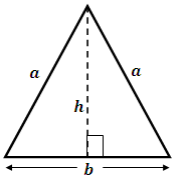
1 day = 24 hours

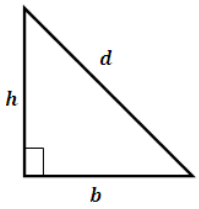
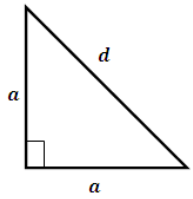
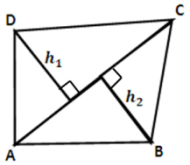
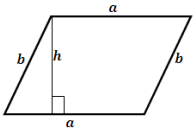
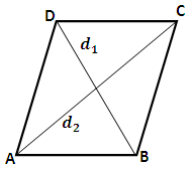
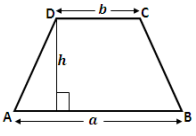
UNITS OF TEMPERATURE

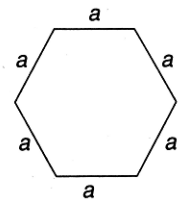
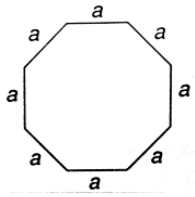
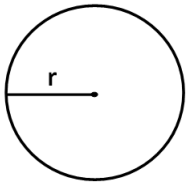
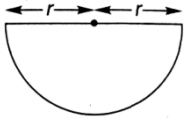
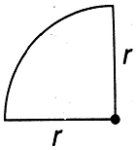
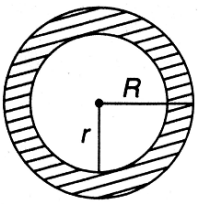
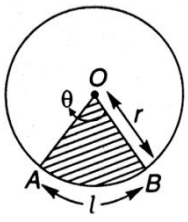
Centigrade (°C) to Fahrenheit (°F): $C = \frac{5}{9}(F - 32)$

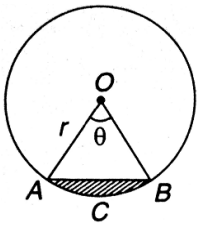
Fahrenheit to Centigrade (°C): $F = \{\frac{9}{5} \times C\} + 32$

2-D FIGURES (PLANE FIGURES)

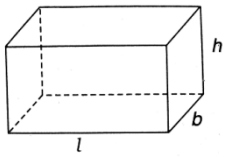
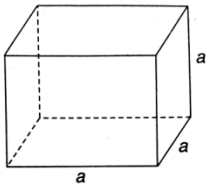
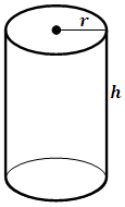
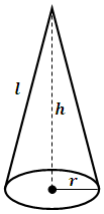
S No.	Name	Figure	Nomenclature	Area	Perimeter
1.	Rectangle		l = length b = breadth $d = \sqrt{l^2 + b^2}$	1. Area=l × b = lb 2. Area of four walls = 2(l+b)h	2 (l + b)
2.	Square		a → side d → diagonal $d = a\sqrt{2}$	(i) $a \times a = a^2$ (ii) $d^2/2$	4a
3.	Triangle (Scalene)		a, b and c are three sides of triangle and s is the semi-perimeter, where $s = \left(\frac{a + b + c}{2}\right)$ b is the base and h is the altitude of triangle	(i) $\frac{1}{2} \times b \times h$ (ii) $\sqrt{s(s-a)(s-b)(s-c)}$ (Heron's formula) (iii) $\frac{1}{2} \times$ *product of sides* × sin *of included angle* i.e. $\frac{1}{2} \times a \times b \times sin\theta$	a + b + c = 2s
4.	Equilateral triangle		a = side h = height or altitude $h = \frac{\sqrt{3}}{2}$ a	(i) $\frac{\sqrt{3}}{4}a^2$	3a
5.	Isosceles triangle		a = equal sides b = base h = height or altitude $h = \frac{\sqrt{4a^2 - b^2}}{2}$	(i) $\frac{1}{2} \times b \times h$ (ii) $\frac{1}{4} \times b \times \sqrt{4a^2 - b^2}$	2a + b

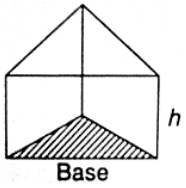
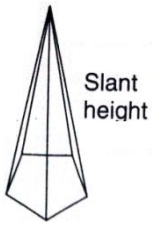
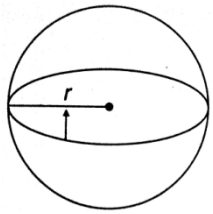
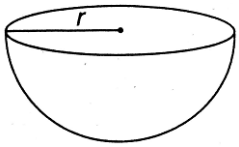
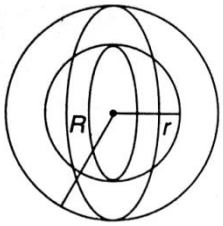
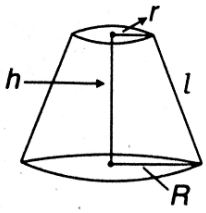
6.	Right angled triangle		b → base h → altitude/ height d → diagonal $d = \sqrt{b^2 + h^2}$	$\frac{1}{2} \times b \times h$	b + h + d
7.	Isosceles right angled triangle		a → equal sides d → diagonal $d = a\sqrt{2}$	$\frac{1}{2}a^2$	2a + d
8.	Quadrilateral		AC is the diagonal and h_1, h_2 are the altitudes on AC from the vertices D and B respectively	Area of △ADC +△ABC $= \frac{1}{2} \times AC \times (h_1 + h_2)$	AB + BC + CD + AD
9.	Parallelogram		a and b are sides adjacent to each other. h = distance between the parallel sides	a × h	2(a + b)
10.	Rhombus		a = length of each side d_1 and d_2 are the diagonals d_1 = BD d_2 = AC	$\frac{1}{2} \times d_1 \times d_2$	4a
11.	Trapezium		a and b are parallel sides to each other and h is the perpendicular distance between parallel sides	$\frac{1}{2}(a + b) \times h$	AB + BC + CD + AD

12.	Regular hexagon		a = length of each side	$\frac{3\sqrt{3}}{2}a^2$	6a
13.	Regular octagon		a → each of equal side	$2a^2(1+\sqrt{2})$	8a
14.	Circle		r → radius of the circle π = 22/7 = 3.1416 (approx.)	πr^2	$2\pi r$ (called as circumference)
15.	Semicircle		r → radius of the circle	$\frac{1}{2}\pi r^2$	$\pi r + 2r$
16.	Quadrant		r → radius	$\frac{1}{4}\pi r^2$	$\frac{1}{2}\pi r + 2r$
17.	Ring or circular path (shaded region)		R → outer radius r → inner radius	$\pi(R^2 - r^2)$	(outer) → $2\pi R$ (inner) → $2\pi r$
18.	Sector of a circle		O → centre of the circle r → radius l → length of the arc θ → angle of the sector $l = 2\pi r\left(\frac{\theta}{360^\circ}\right)$	(i) $\pi r^2 \frac{\theta}{360^\circ}$ (ii) $\frac{1}{2}r \times l$	$l + 2r$

19.	Segment of a circle		θ → angle of the sector r → radius AB → chord ACB → arc of the circle	Area of segment ACB (minor segment) = $r^2\left[\frac{\pi\theta}{360°} - \frac{\sin\theta}{2}\right]$	$2r\left[\frac{\pi\theta}{360°} + \sin\frac{\theta}{2}\right]$

3-D FIGURES (SOLIDS)

S No.	Name	Figure	Nomenclature	Volume	Curved/ Lateral Surface Area	Total Surface Area
1.	Cuboid		l = length b = breadth h = height	Lbh	2 (l + b)h	2(lb + bh + hl)
2.	Cube		a= edge/ side	a^3	$4a^2$	$6a^2$
3.	Right circular cylinder		r = radius of base. h = height of the cylinder	$\pi r^2 h$	$2\pi rh$	$2\pi r\ (h + r)$
4.	Right circular cone		r = radius h = height *l*=slant height $l = \sqrt{r^2 + h^2}$	$\frac{1}{3}\pi r^2 h$	Πrl	πr (l + r)

5.	Right triangular prism		h = height Area of base =B Perimeter of base =P	B × h	P × h	P×h + 2 (B)
6.	Right pyramid		h = height l = slant height Area of base =B Perimeter of base =P	$\frac{1}{3}$ × B × h	$\frac{1}{2}$× P × l	$\frac{1}{2}$× P × l + B
7.	Sphere		r = radius	$\frac{4}{3}\pi r^3$	$4\pi r^2$	$4\pi r^2$
8.	Hemi-sphere		r = radius	$\frac{2}{3}\pi r^3$	$2\pi r^2$	$3\pi r^2$
9.	Spherical shell		r = inner radius R = outer radius	$\frac{4}{3}\pi$ [$R^3 - r^3$]		4π [$R^2 + r^2$]
10.	Frustum of a cone			$\frac{\pi}{3}$h (r^2 + Rr + R^2)	π (r + R) l	π (r + R) l + π [R^2+r^2]