



◆ Algebra Formula ◆

$$(1) (a+b)^2 = a^2 + 2ab + b^2 = (a-b)^2 + 4ab.$$

$$(2) (a-b)^2 = a^2 - 2ab + b^2 = (a+b)^2 - 4ab.$$

$$(3) a^2 - b^2 = (a+b)(a-b)$$

$$(4) 4ab = (a+b)^2 - (a-b)^2$$

$$(5) ab = \left(\frac{a+b}{2}\right)^2 - \left(\frac{a-b}{2}\right)^2$$

$$(6) (a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 = a^3 + b^3 + 3ab(a+b)$$

$$(7) (a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 = a^3 - b^3 - 3ab(a-b)$$

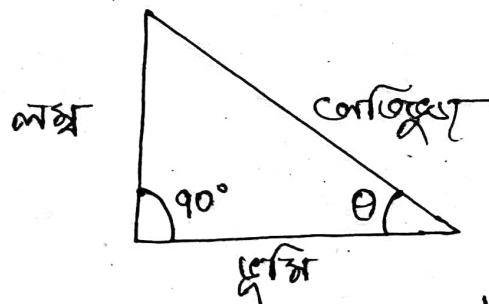
$$(8) (a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca.$$

$$(9) (a+b+c)^3 = a^3 + b^3 + c^3 + 3(a+b)(b+c)(c+a)$$

* $ax^2 + bx + c$ মূলবিন্দু ২ (উৎসর্গ করে) ২টা $b^2 - 4ac = 0$

$$\left[\begin{array}{l} \text{অধিক কমান্ড - এর মূল,} \\ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \end{array} \right]^2$$

◆ Trigonometry Formula ◆



$$(1) \sin \theta = \frac{\text{লম্ব}}{\text{কোটি}}$$

$$(4) \operatorname{cosec} \theta = \frac{1}{\sin \theta} = \frac{\text{কোটি}}{\text{লম্ব}}$$

$$(2) \cos \theta = \frac{\text{পূর্ন্ব}}{\text{কোটি}}$$

$$(5) \sec \theta = \frac{1}{\cos \theta} = \frac{\text{কোটি}}{\text{পূর্ন্ব}}$$

$$(3) \tan \theta = \frac{\text{লম্ব}}{\text{পূর্ন্ব}}$$

$$(6) \cot \theta = \frac{1}{\tan \theta} = \frac{\cos \theta}{\sin \theta} = \frac{\text{পূর্ন্ব}}{\text{লম্ব}}$$

$$\therefore \tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$(7) \sin^2 \theta + \cos^2 \theta = 1$$

$$(8) \sec^2 \theta - \tan^2 \theta = 1$$

$$(9) \operatorname{cosec}^2 \theta - \cot^2 \theta = 1$$

$$\begin{cases} 180^\circ = \pi \\ 90^\circ = \frac{\pi}{2} \end{cases}$$

(16)

$$(10) \sin(90^\circ - \theta) = \cos \theta$$

$$(11) \cos(90^\circ - \theta) = \sin \theta$$

$$(12) \operatorname{cosec}(90^\circ - \theta) = \sec \theta$$

$$(13) \sec(90^\circ - \theta) = \operatorname{cosec} \theta$$

$$(14) \tan(90^\circ - \theta) = \cot \theta$$

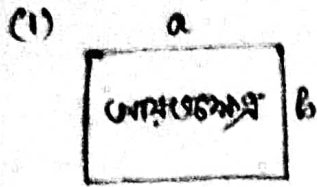
$$(15) \cot(90^\circ - \theta) = \tan \theta$$

	0°	$30^\circ \left(\frac{\pi}{6}\right)$	$45^\circ \left(\frac{\pi}{4}\right)$	$60^\circ \left(\frac{\pi}{3}\right)$	$90^\circ \left(\frac{\pi}{2}\right)$
sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞
cosec	∞	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1
sec	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞
cot	∞	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0

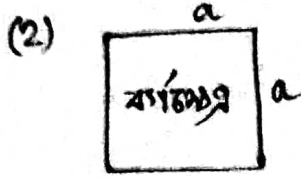


Prepared By Mr. Rahul Chandra.

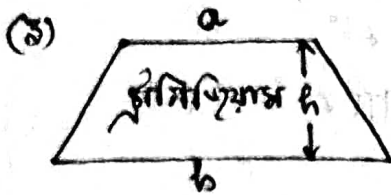
◆ Mensuration Formula ◆



परिमाप = $2(a+b)$
 क्षेत्रफल = ab
 विकर्ण = $\sqrt{a^2+b^2}$



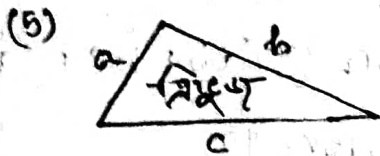
परिमाप = $4a$
 क्षेत्रफल = a^2
 विकर्ण = $\sqrt{2}a$



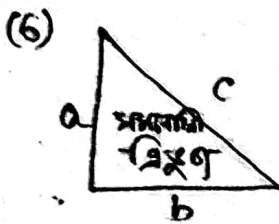
क्षेत्रफल = $\frac{1}{2} \times (a+b) \times h$



परिमाप = $4a$
 क्षेत्रफल = $\frac{1}{2} \times$ विकर्णों के गुणफल
 $= \frac{1}{2} \times x \times y$
 $x^2 + y^2 = 4a^2$



परिमाप = $a+b+c$
 अर्ध-परिमाप (s) = $\frac{a+b+c}{2}$
 क्षेत्रफल = $\sqrt{s(s-a)(s-b)(s-c)}$



क्षेत्रफल = $\frac{1}{2} \times$ भुजा \times भुजा
 $= \frac{1}{2} \times ab$

कैथी² = लंब² + भुजा²

परिकर्माप = $3a$



परिमाप = $3a$

भुजा = $\frac{\sqrt{3}}{2} a$

क्षेत्रफल = $\frac{\sqrt{3}}{4} a^2$

परिकर्माप = $\frac{\sqrt{3}}{3} a$

कैथी:भुजा = $\frac{\sqrt{3}}{6} a$

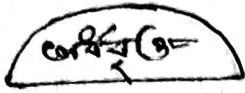
(8)



$\text{परिमाप} = 2\pi r$
 $\text{क्षेत्रफल} = \pi r^2$



(9)



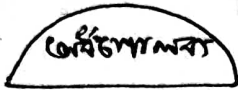
$\text{परिमाप} = \pi r^2 + 2r$
 $\text{क्षेत्रफल} = \frac{\pi r^2}{2}$

(10)



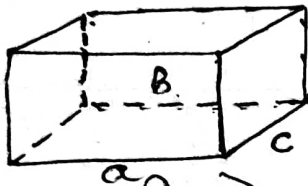
$\text{आयतन} = \frac{4}{3} \pi r^3$
 $\text{पृष्ठफल} = 4\pi r^2$
 $\text{अक्षरूपफल} = 4\pi r^2$

(11)



$\text{आयतन} = \frac{2}{3} \pi r^3$
 $\text{पृष्ठफल} = 3\pi r^2$
 $\text{अक्षरूपफल} = 2\pi r^2$

(12)



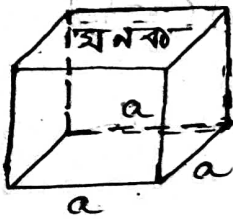
अक्षरूपकोणी त्रिभुज

$\text{बर्गण्य} = \sqrt{a^2 + b^2 + c^2}$
 $\text{आयतन} = abc$

$\text{अक्षरूपफल} = 2(ab + bc + ca)$

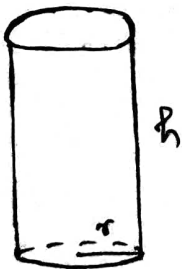
बर्गण्य = 8, आयतन = 6, अक्षरूपफल = 12

(13)



$\text{बर्गण्य} = \sqrt{3} a$
 $\text{आयतन} = a^3$
 $\text{अक्षरूपफल} = 6a^2$

(14)



अक्षरूपकोणी त्रिभुज

$\text{आयतन} = \pi r^2 h$
 $\text{पृष्ठफल} = 2\pi r h$
 $\text{अक्षरूपफल} = 2\pi r (r + h)$

Science :-



- (1) अवन = S
- (2) अवन = t sec
- (3) त्वरण (f) = $\frac{v}{t}$ cm/sec² or m/sec²
- (4) बल (P) = mf ग्राम or किलोग्राम
- (5) कार्य (W) = $P \cdot S$ जर्ज or जूल
- (6) शक्ति = $\frac{W}{t}$ जर्ज/सेक or जूल/सेक = वाट (Watt)
- (7) वेग (v) = $\frac{S}{t}$ cm/sec or m/sec
- (8) स्थितिज ऊर्जा = mgh
- (9) गतिज ऊर्जा = $\frac{1}{2}mv^2$
- (10) कार्य = mgx
- (11) $S = ut + \frac{1}{2}ft^2$
- (12) $v = u + ft$
- (13) $v^2 = u^2 + 2fs$
- (14) $h = ut + \frac{1}{2}gt^2$
- (15) $v = u + gt$
- (16) $v^2 = u^2 + 2gh$
- (17) $\frac{C}{5} = \frac{F - 32}{9}$
- (18) $K = 273 + C$
- (19) बरफ गलन के लिये ताप = 80 cal/gm.
- (20) बाष्पीकरण के लिये ताप = 537 cal/gm.
- (21) स्थितिज ऊर्जा = गतिज ऊर्जा = mst .
- (22) 1 मोल = 6.023×10^{23} = 22.4 litre.
- (23) α^4 β^0 γ^0
- (24) बरफ गलन -ve
- (25) बरफ गलन +ve
- (26) जल गलन +ve
- (27) जल गलन -ve



Mass, Weight & Density

- 1) Mass = Volume \times Density. or, $M = V \times \rho$
- 2) Weight = Mass \times Gravitational force. or, $W = m \times g$.
- 3) Density = $\frac{\text{Mass}}{\text{Volume}} = \frac{m}{V}$ or, $\rho = \frac{m}{V}$.
- 4) Specific Gravity = $\frac{\text{Density of the Substance}}{\text{Density of Water at } 4^\circ\text{C}}$.
- 5) Specific Gravity of Solids in Soluble in Water
= $\frac{\text{Weight of Solid in Air}}{\text{Loss of weight of Solid in Water}}$.
- 6) Specific Gravity of a liquid
= $\frac{\text{Loss weight of a Solid in Water}}{\text{Loss of weight of the same liquid in liquid}}$.
- 7) Specific Gravity of Solids Soluble in Water
= $\frac{\text{Weight of solid in air} \times \text{sp. gravity of the liquid}}{\text{Loss of weight of solid in which the solid is in solution}}$.

Speed & Velocity

- 1) Speed = $\frac{\text{Distance Traveled}}{\text{Time}}$ or, $S = \frac{d}{t}$.
- 2) Velocity = $\frac{\text{Displacement}}{\text{Time}}$ or, $V = \frac{S}{t}$.
- 3) Average Velocity = $\frac{\text{Total Distance Travelled}}{\text{Time Taken}}$.
- 4) Acceleration = $\frac{\text{Change in Velocity}}{\text{Time Taken}}$
or,
= $\frac{\text{Final Velocity} - \text{Initial Velocity}}{\text{Time Taken}}$
or, $a = \frac{v - u}{t}$.
- 5) Momentum = mass \times Velocity. or, $p = m \times v$.
- 6) Force = mass \times acceleration. or, $F = m \times a$.

Equation of Motion:

1) $V = u + at$

2) $S = ut + \frac{1}{2}at^2$

3) $v^2 - u^2 = 2as$

A. Free Falling Bodies:

1) $V = u + gt$

* N.B.

where, value of $g = 9.8 \text{ m/sec}^2$.

2) $S = ut + \frac{1}{2}gt^2$

3) $v^2 - u^2 = 2gs$

B. Bodies Thrown Vertically Upwards:

1) $V = u - gt$

2) $S = ut - \frac{1}{2}gt^2$

3) $v^2 - u^2 = -2gs$

Work, Power & Energy

1) Work = Force \times Displacement. or, $W = F \times S$.

2) Power = $\frac{\text{Work Done}}{\text{Time Taken}}$ or, $P = \frac{F \times S}{t}$.

3) Energy = Power \times Time or, $E = P \times t$.

4) Kinetic Energy, $KE = \frac{1}{2}mv^2$.

5) Potential Energy, $PE = mgh$.

Heat & Temperature

1) $\frac{C}{5} = \frac{F - 32}{9} = \frac{R}{4} = \frac{K - 273}{5}$



2) Specific Heat of Solid:
$$S = \frac{(W + m_1 s_1)(t - t_1)}{(t_2 - t_1)m}$$

3) Specific Heat of Liquid:
$$S = \frac{m s_2 (t_2 - t)}{m_2 (t - t_1)} - \frac{m_1 s_1}{m_2}$$

*N.B.

S = Specific Heat, m = mass of Solid, W = mass of water,
 m_1 = mass of calorimeter; m_2 = mass of liquid; t_1 = initial temp.
of liquid; t_2 = temp. of Solid; s_1 = Specific Heat of calorimeter;
 s_2 = Specific heat of Solid.

4) Thermal Capacity = $m \times S$ where S = Specific Heat.

5) Co-efficient of Linear Expansion (α)

$$\alpha = \frac{L_t - L_0}{L_0 t} \quad \text{or,} \quad \alpha = \frac{\Delta L}{L \cdot \Delta t}$$

where,

L_t = increase in length after increase in temperature.

L_0 = Original length.

t = Difference of two temperature.

6) $H = m s t$

Basic Electricity

1) Current = $\frac{\text{Charge}}{\text{Time}}$ or, $I = \frac{Q}{t}$

2) $R = \rho \frac{L}{a}$

3) $I = \frac{V}{R}$

4) Series Connection: $R = r_1 + r_2 + r_3 + \dots$

5) Parallel Connection: $\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3} + \dots$

6) Series Parallel Connection: $r_1 + \frac{1}{\frac{1}{r_2} + \frac{1}{r_3}}$