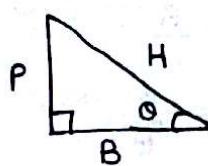


#



$$\sin \theta = \frac{P}{H}$$

$$\csc \theta = \frac{H}{P}$$

$$\sin \theta \cdot \csc \theta = 1$$

$$\cos \theta = \frac{B}{H}$$

$$\sec \theta = \frac{H}{B}$$

$$\cos \theta \cdot \sec \theta = 1$$

P → लंब  
B → आधार  
H → कर्ण

$$\tan \theta = \frac{P}{B}$$

$$\cot \theta = \frac{B}{P}$$

$$\tan \theta \cdot \cot \theta = 1$$

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

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

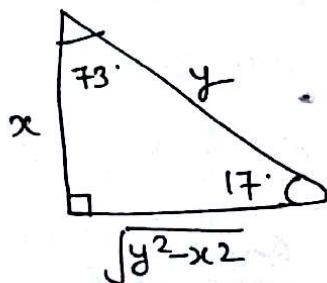


#

	0°	30°	45°	60°	90°
$\sin \theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan \theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	$\infty$
$\csc \theta$	$\infty$	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1
$\sec \theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	$\infty$
$\cot \theta$	$\infty$	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0



① यदि  $\sin 17 = \frac{x}{y}$  - find  $\sec 17 - \sin 73$ .



$$\sin 17 = \frac{x}{y}$$

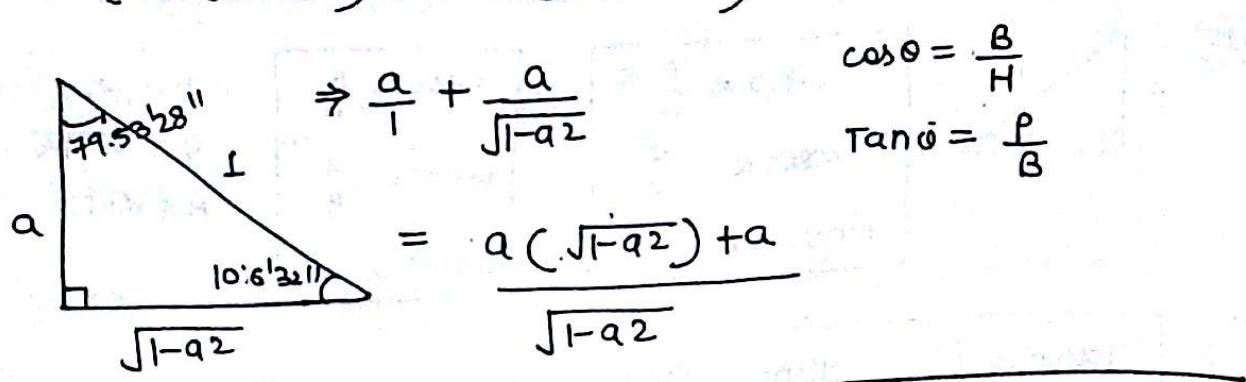
$$\sec 17 - \sin 73 = \frac{y}{\sqrt{y^2 - x^2}} - \frac{\sqrt{y^2 - x^2}}{y}$$

$$\Rightarrow \frac{y^2 - (y^2 - x^2)}{y\sqrt{y^2 - x^2}} \Rightarrow \frac{x^2}{y\sqrt{y^2 - x^2}}$$

Ans

② यदि  $\sin(10^\circ 6' 32'') = a$

$$\cos(79^\circ 53' 28'') + \tan(10^\circ 6' 32'') = ?$$



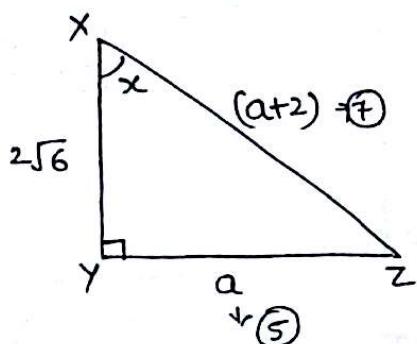
$$\cos \theta = \frac{B}{H}$$

$$\tan \theta = \frac{P}{B}$$

③  $\Delta XYZ$  में  $\angle Y = 90^\circ$

$$XY = 2\sqrt{6} \quad \sec x + \tan x = ?$$

$$XZ - YZ = 2$$



$$(2\sqrt{6})^2 + a^2 = (a+2)^2$$

$$24 + \frac{a^2}{25} = (5+2)^2$$

$$\therefore [a=5]$$

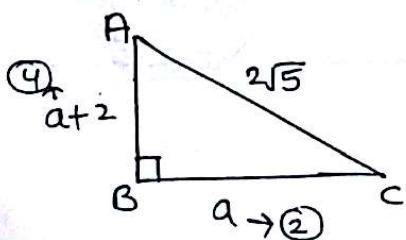
a का मान रखो  
ताकि eqn satisfy  
हो।

$$\sec x + \tan x = \frac{7}{2\sqrt{6}} + \frac{5}{2\sqrt{6}} = \frac{12}{2\sqrt{6}} = \frac{6}{\sqrt{6}} = \sqrt{6} \text{ Ans}$$

④  $\Delta ABC$  में,  $\angle B = 90^\circ$

$$AB - BC = 2, AC = 2\sqrt{5}$$

$$\cos^2 A - \cos^2 C = ?$$



$$(a+2)^2 + a^2 = (2\sqrt{5})^2$$

$$(a+2)^2 + a^2 = 20$$

$$\therefore [a=2]$$

$$\cos^2 A - \cos^2 C = \left(\frac{4}{2\sqrt{5}}\right)^2 - \left(\frac{2}{2\sqrt{5}}\right)^2$$

$$= \frac{16}{20} - \frac{4}{20} = \frac{12}{20} = \frac{3}{5} \text{ Ans.}$$

(5)  $2\sin\alpha + 15\cos^2\alpha = 7$ ,  $0^\circ < \alpha < 90^\circ$

$\cot\alpha = ?$

- A)  $\frac{3}{5}$     B)  $\frac{5}{4}$     C)  $\frac{1}{2}$     D)  $\frac{1}{4}$

$\cot\alpha = \frac{B}{P}$

$2\sin\alpha + 15\cos^2\alpha = 7$

यहाँ  $\sqrt{H^2 + B^2}$  नहीं घटा कर्ता है

मना चाहिए इसलिए कर्मजुल नहीं बनेगा

∴ जो श्री value आयेगी वो Triplet बनायेगी  
only option A है जिसमें Triplet बन रहा है

$$\cot\alpha = \frac{B}{P} \underset{\text{H}}{\equiv} \frac{3}{4}, H=5$$

∴  $\cot\alpha = \frac{3}{4}$  Ans.

$2\sin\alpha + 15\cos^2\alpha = 7$

$2 \times \frac{4}{5} + 15 \times \frac{9}{25} = 7$

$\frac{8}{5} + \frac{27}{5} \Rightarrow \frac{35}{5} \Rightarrow 7 = 7$  (सत्य)

\* option B को ले:

$$\cot\alpha = \frac{B}{P} \underset{\text{H}}{\equiv} \frac{5}{4} \quad \therefore H = \sqrt{41}$$

∴  $2\sin\alpha + 15\cos^2\alpha = 7$

$2 \times \frac{4}{\sqrt{41}} + 15 \times \left(\frac{5}{\sqrt{41}}\right)^2$

ये कभी सत्त्व नहीं होंगे।



OR

$2\sin\alpha + 15(1-\sin^2\alpha) = 7$

$2\sin\alpha + 15 - 15\sin^2\alpha = 7$

$-15\sin^2\alpha + 2\sin\alpha + 8 = 0$

$15\sin^2\alpha - 2\sin\alpha - 8 = 0$

$3\sin\alpha[5\sin\alpha - 4] + 2[5\sin\alpha - 4] = 0$

$[3\sin\alpha + 2][5\sin\alpha - 4] = 0$

$$3\sin \alpha + 2 = 0$$

$$\sin \alpha = -\frac{2}{3}$$

$$5\sin \alpha = 4$$

$$\sin \alpha = \frac{4}{5} = \frac{P}{H}, B=3$$

$$\therefore \cot \alpha = \frac{3}{4} \text{ Ans}$$

- (6)  $2 - \cos^2 \theta = 3 \sin \theta \cdot \cos \theta, \tan \theta = ?$  A)  $\frac{1}{2}$  B) 0  
option से C)  $\frac{2}{3}$  D)  $\frac{1}{3}$

A)  $\tan \theta = \frac{1-P}{2-B}; H = \sqrt{5}$

$$2 - \cos^2 \theta = 3 \sin \theta \cdot \cos \theta$$

$$2 - \frac{4}{5} = 3 \times \frac{1}{\sqrt{5}} \times \frac{2}{\sqrt{5}} \quad \therefore \tan \theta = \frac{1}{2} \text{ Ans}$$

$$\frac{6}{5} = \frac{6}{5} \text{ (सत्य)}$$

#

$$\sec^2 \theta - \tan^2 \theta = 1$$

$$\sec^2 \theta = 1 + \tan^2 \theta$$

$$\tan^2 \theta = \sec^2 \theta - 1$$

$$(\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = 1$$

$$(\sec \theta - \tan \theta) = \frac{1}{\sec \theta + \tan \theta}$$

$$(\sec \theta + \tan \theta) = \frac{1}{\sec \theta - \tan \theta}$$

- (7)  $\sec \theta + \tan \theta = 3, \cos \theta = ?$

$$(\sec \theta - \tan \theta)(\sec \theta + \tan \theta) = 1$$

$$\downarrow \frac{1}{3} \quad \downarrow 3$$

$$\therefore \sec \theta + \tan \theta = \frac{10}{3}$$

$$\sec \theta - \tan \theta = \frac{1}{3}$$

$$\frac{\sec \theta + \tan \theta}{\sec \theta - \tan \theta} = \frac{10}{3}$$

$$\sec \theta = \frac{5}{3}$$

$$\therefore \cos \theta = \frac{3}{5} \text{ Ans}$$



#

$$\cosec^2 \theta - \cot^2 \theta = 1$$

$$\cosec^2 \theta = 1 + \cot^2 \theta$$

$$\cot^2 \theta = \cosec^2 \theta - 1$$

$$(\cosec \theta - \cot \theta)(\cosec \theta + \cot \theta) = 1$$

$$\downarrow \quad \downarrow \quad \frac{1}{x} \quad = 1$$

$$\therefore x \times \frac{1}{x} = 1$$

⑧  $\csc \theta + \cot \theta = 2 + \sqrt{5}$ ,  $\sin \theta = ?$

$$\csc \theta + \cot \theta = \sqrt{5} + 2$$

$$\csc \theta - \cot \theta = \sqrt{5} - 2$$

$$2 \csc \theta = 2\sqrt{5}$$

$$\csc \theta = \sqrt{5}$$

$$\therefore \sin \theta = \frac{1}{\sqrt{5}} \quad \underline{\text{Ans}}$$

⑨ if  $\sin \theta + \sin^2 \theta = 1$

#  $\sin^2 \theta + \cos^2 \theta = 1$

$$\cos^4 \theta + 3 \cos^10 \theta + 3 \cos^8 \theta + \cos^6 \theta + 64 = ?$$

$$a^3 + 3a^2b + 3ab^2 + b^3 + 64$$

$$\sin^2 \theta = 1 - \cos^2 \theta$$

$$\cos^2 \theta = 1 - \sin^2 \theta$$

$$\therefore (\cos^4 \theta + \cos^2 \theta)^3 + 64$$

$$[a = \cos^4 \theta]$$

$$b = \cos^2 \theta$$

$$\Rightarrow \sin \theta + \sin^2 \theta = 1$$

$$\sin \theta = 1 - \sin^2 \theta$$

$$\sin \theta = \cos^2 \theta$$

$$\sin^2 \theta = \cos^4 \theta$$

$$\therefore (\sin^2 \theta + \cos^2 \theta)^3 + 64 = 65 \quad \underline{\text{Ans}}$$



⑩ यदि  $\sin \theta + \sin^2 \theta + \sin^3 \theta = 1$ ,  $\cos^6 \theta - 4 \cos^4 \theta + 8 \cos^2 \theta = ?$

$$\sin \theta + \sin^3 \theta = 1 - \sin^2 \theta$$

$$\therefore (1 - \cos^2 \theta)[4 + \cos^4 \theta - 4 \cos^2 \theta] = \cos^4 \theta$$

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

$$\Rightarrow 4 + \cos^4 \theta - 4 \cos^2 \theta - 4 \cos^2 \theta - \cos^6 \theta +$$

$$4 \cos^4 \theta = \cos^4 \theta$$

$$\Rightarrow -\cos^6 \theta + 4 \cos^4 \theta - 8 \cos^2 \theta = -4$$

$$\Rightarrow \cos^6 \theta - 4 \cos^4 \theta + 8 \cos^2 \theta = 4 \quad \underline{\text{Ans}}$$

वर्ग करने पर

$$\sin^2 \theta (2 - \cos^2 \theta)^2 = \cos^4 \theta$$

• ⑪ यदि  $\cos \theta + \cos^2 \theta = 1$ ,  $\sin^8 \theta + 2 \sin^6 \theta + \sin^4 \theta = ?$

$$\cos \theta = 1 - \cos^2 \theta$$

$$a^2 \quad \downarrow \quad 2ab \quad \downarrow \quad b^2$$

$$\cos \theta = \sin^2 \theta$$

$$(\sin^4 \theta + \sin^2 \theta)^2$$

$$\cos^2 \theta = \sin^4 \theta$$

$$\Rightarrow (2 \cos^2 \theta + \sin^2 \theta)^2 = 1 \quad \underline{\text{Ans}}$$

(12) यदि  $(1+\sin\theta)(1+\sin\alpha)(1+\sin\beta) = (1-\sin\theta)(1-\sin\alpha)(1-\sin\beta) = ?$

A)  $\pm \cos\theta \cdot \cos\alpha \cdot \cos\beta$       B)  $\pm \cos^2\theta \cdot \cos^2\alpha \cdot \cos^2\beta$

C)  $\pm \sec\theta \cdot \sec\alpha \cdot \sec\beta$       D)  $\pm \sin\theta \cdot \sin\alpha \cdot \sin\beta$

$$(1+\sin\theta)(1+\sin\alpha)(1+\sin\beta) = (1-\sin\theta)(1-\sin\alpha)(1-\sin\beta) = x$$

$$\Rightarrow x = (1+\sin\theta)(1+\sin\alpha)(1+\sin\beta)$$

$$x = \underline{(1-\sin\theta)(1-\sin\alpha)(1-\sin\beta)}$$

$$x^2 = \cos^2\theta \cdot \cos^2\alpha \cdot \cos^2\beta$$

$$\therefore x = \pm \cos^2\theta \cos\alpha \cos\beta \quad \underline{\text{Ans}}$$

$$\begin{aligned} & \because (1+\sin\theta)(1-\sin\theta) \\ &= 1 - \sin^2\theta \\ &= \cos^2\theta \end{aligned}$$

# if  $\frac{ax+by}{\sqrt{a^2+b^2}} = m$   
 $\frac{bx-ay}{\sqrt{a^2+b^2}} = n$   
तब  $(a^2+b^2)(x^2+y^2) = m^2+n^2$

#  $a\sin\theta + b\cos\theta = m$   
 $b\sin\theta - a\cos\theta = \sqrt{a^2+b^2} = n$

(13)  $\frac{x}{a}\sin\theta + \frac{y}{b}\cos\theta = \frac{1}{2}$        $\Rightarrow \sqrt{\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{1}{4}} \quad \underline{\text{Ans}}$   
 $\frac{y}{b}\sin\theta - \frac{x}{a}\cos\theta = ?$

(14)  $1\sin\theta + 1\cos\theta = \frac{2}{3}$   
 $1\sin\theta - 1\cos\theta = ? \Rightarrow \sqrt{1^2+1^2 - \left(\frac{2}{3}\right)^2} = \sqrt{2 - \frac{4}{9}} = \frac{\sqrt{14}}{3} \quad \underline{\text{Ans}}$

(15)  $1\sin\theta + 1\cos\theta = \frac{17}{13}$   
 $1\sin\theta - 1\cos\theta = ? \Rightarrow \sqrt{1^2+1^2 - \left(\frac{17}{13}\right)^2} = \sqrt{2 - \frac{289}{169}} = \sqrt{\frac{49}{169}} = \frac{7}{13} \quad \underline{\text{Ans}}$

(16)  $3\sin\theta + 4\cos\theta = 5$ ,  $\tan\theta = ?$

$$4\sin\theta - 3\cos\theta = \sqrt{3^2+4^2-5^2} = 0$$

$$4\sin\theta - 3\cos\theta = 0$$

$$4\sin\theta = 3\cos\theta$$

$$\begin{aligned} \frac{\sin\theta}{\cos\theta} &= \frac{3}{4} \\ \therefore \tan\theta &= \frac{3}{4} \quad \underline{\text{Ans}} \end{aligned}$$

(OR)  $3\sin\theta + 4\cos\theta = 5$  (3, 4, 5 → Triplet  
 $\downarrow \quad \downarrow$   
P B (समकोण त्रिकोण की भुज)

अगर Triplet बन रहा हो तो sin के साथ वाला P (लंब) तथा cos के साथ वाला B (आधार) होता है।

$$\therefore \tan\theta = \frac{P}{B} = \frac{3}{4} \text{ Ans.}$$

CLASS  
66

By: Pardip Chhoker

7206446517

(7)  $(a^2 - b^2)\sin\theta + 2ab\cos\theta = a^2 + b^2$ ,  $\tan\theta = ?$   
 $\downarrow \quad \downarrow$   
P B Triplet बन रहा है

$$\therefore \tan\theta = \frac{a^2 - b^2}{2ab} \text{ Ans}$$



(8)  $x\sin\theta - y\cos\theta = \sqrt{x^2 + y^2}$

$$\frac{\cos^2\theta}{a^2} + \frac{\sin^2\theta}{b^2} = \frac{1}{x^2 + y^2}$$

कौन सा विकल्प सही है

$$x\sin\theta - y\cos\theta = \sqrt{x^2 + y^2}$$

A  $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$

B  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

C  $\frac{x^2}{b^2} - \frac{y^2}{a^2} = 1$

D  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

$$\left( \frac{x}{\sqrt{x^2 + y^2}} \right) \sin\theta + \left( \frac{-y}{\sqrt{x^2 + y^2}} \right) \cos\theta = 1$$

$\sin\theta$   $\cos\theta$

$$\Rightarrow \frac{\cos^2\theta}{a^2} + \frac{\sin^2\theta}{b^2} = \frac{1}{x^2 + y^2}$$

$$\Rightarrow \frac{y^2}{(x^2 + y^2)a^2} + \frac{x^2}{(x^2 + y^2)b^2} = \frac{1}{x^2 + y^2}$$

$$\Rightarrow \frac{1}{x^2 + y^2} \left( \frac{y^2}{a^2} + \frac{x^2}{b^2} \right) = \frac{1}{x^2 + y^2}$$

$$\therefore \frac{y^2}{a^2} + \frac{x^2}{b^2} = 1 \text{ Ans.}$$

\*  $\sin^2\theta + \cos^2\theta = 1$

$$(\sin\theta) \sin\theta + (\cos\theta) \cos\theta = 1$$

$\sin\theta$   $\cos\theta$

$$\frac{x}{\sqrt{x^2 + y^2}} \quad \frac{-y}{\sqrt{x^2 + y^2}}$$

$$\textcircled{19} \quad 10\sin^4\theta + 15\cos^4\theta = 6$$

$$27\csc^6\theta + 8\sec^6\theta = ?$$

$$\Rightarrow \frac{10}{6}\sin^4\theta + \frac{15}{6}\cos^4\theta = 1$$

$$\left(\frac{5}{3}\right)\sin^4\theta + \left(\frac{5}{2}\right)\cos^4\theta = 1$$

$\downarrow \qquad \downarrow$

$$\frac{1}{\sin^2\theta} \qquad \frac{1}{\cos^2\theta}$$

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

$$\frac{1}{\sin^2\theta} = \csc^2\theta = \frac{5}{3}$$

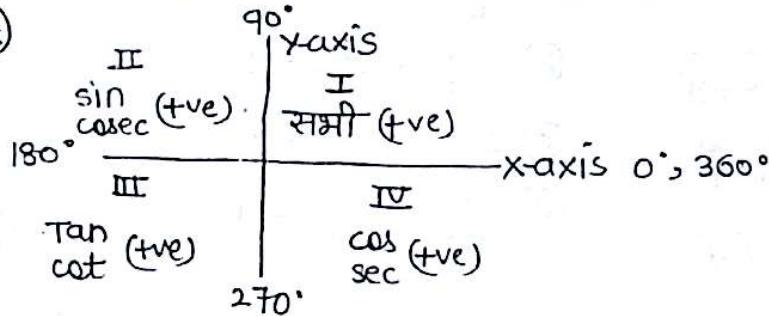
$$\frac{1}{\cos^2\theta} = \sec^2\theta = \frac{5}{2}$$

$$\Rightarrow 27(\csc^2\theta)^3 + 8(\sec^2\theta)^3$$

$$= 27\left(\frac{5}{3}\right)^3 + 8\left(\frac{5}{2}\right)^3$$

$$= 27 \times \frac{125}{27} + 8 \times \frac{125}{8} = 250 \text{ Ans}$$

$\oplus$



$\textcircled{20}$   $3\tan\theta - 4 = 0$ ,  $\theta$  पहले quadrant में नहीं है।

$$5\sin^2\theta + 3\sin\theta + 4\cos\theta = ?$$

$$\tan\theta = \frac{4}{3}$$

$$H = 5$$

( $\tan\theta = \frac{4}{3}$  +ve है। तो  $\theta$  तीसरे quadrant में है)

$$\Rightarrow 5 \times 2\sin\theta\cos\theta + 3\sin\theta + 4\cos\theta$$

$$\Rightarrow 10\left(-\frac{4}{5}\right)\left(-\frac{3}{5}\right) + 3\left(-\frac{4}{5}\right)\left(-\frac{3}{5}\right) -$$

$$\Rightarrow \frac{24}{5} - \frac{12}{5} - \frac{12}{5} = 0 \quad \underline{\underline{\text{Ans.}}}$$

$\sin, \cos$  तीसरे quadrant में (-ve) होते हैं इसलिए (-ve) मान लिए गए हैं।

$\oplus$

$$3\sin\theta + 4\cos\theta = 5$$

$$\therefore \frac{3}{5}\sin\theta + \frac{4}{5}\cos\theta = 1$$

$\downarrow \qquad \downarrow$

$$\sin\theta \qquad \cos\theta$$

$$\therefore \sin^2\theta + \cos^2\theta = 1$$

$$\therefore \sin\theta = \frac{3}{5}, \cos\theta = \frac{4}{5}$$

172



#  $(x\text{-axis} \pm \theta) \rightarrow$  कोई बदलाव नहीं

 $\sin(360 + \theta) = +\sin\theta$ 
 $\cos(180 - \theta) = -\cos\theta$ 
 $\tan(180 + \theta) = +\tan\theta$

+ था - का चिन्ह  
Quadrant के दिसाब से आयेगा.

Q1 A, B, C, D किसी घन्तीय चतुर्भज के शीर्ष हैं।

$\cos A + \cos B + \cos C + \cos D = ?$

$A + C = 180^\circ$

$C = 180^\circ - A$

$B + D = 180^\circ$

$D = 180^\circ - B$



$\therefore \cos A + \cos B + \cos(180^\circ - A) + \cos(180^\circ - B)$

$\Rightarrow \cancel{\cos A} + \cancel{\cos B} - \cancel{\cos A} - \cancel{\cos B}$

$= 0 \quad \underline{\text{Ans}}$

$(180^\circ - A) =$  दूसरा घण्ठ.  
दूसरे घण्ठ. में  $\cos(-ve)$  देता है

22  $\sin 10^\circ + \sin 20^\circ + \dots + \sin 340^\circ + \sin 350^\circ$

$\Rightarrow \sin(360^\circ - 350^\circ) + \sin(360^\circ - 340^\circ) + \dots + \sin 180^\circ + \dots + \sin 340^\circ + \sin 350^\circ$

$\Rightarrow -\cancel{\sin 350^\circ} - \cancel{\sin 340^\circ} - \dots + \sin 180^\circ + \dots + \sin 340^\circ + \sin 350^\circ$

$\Rightarrow \sin 180^\circ \Rightarrow \sin(180^\circ + 0) \Rightarrow -\sin 0 \Rightarrow 0 \quad \underline{\text{Ans}}$

#

(Y-axis  $\pm \theta$ )

ऐसे बदलाव होगा

$\sin\theta \leftrightarrow \cos\theta$

$\tan\theta \leftrightarrow \cot\theta$

$\csc\theta \leftrightarrow \sec\theta$

$\tan(270^\circ + \theta) = -\cot\theta$

$\sin(270^\circ + \theta) = -\cos\theta$

$\sec(90^\circ + \theta) = -\csc\theta$

↓  
quadr. में इसको check करना है

(23) if  $A+B = 90^\circ$

$$\sin^2 A + \sin^2 B = ?$$

$$A+B = 90^\circ \Rightarrow B = 90^\circ - A$$

$$\sin^2 A + \sin^2(90^\circ - A)$$

$$\sin^2 A + \cos^2 A$$

$$= 1 \text{ Ans.}$$

(24) if  $A+B = 90^\circ$

$$\sin A \cdot \sec B = ?$$

$$A+B = 90^\circ \Rightarrow B = (90^\circ - A)$$

$$\sin A \cdot \sec(90^\circ - A)$$

$$\sin A \cdot \csc A$$

$$\sin A \cdot \frac{1}{\sin A} = 1 \text{ Ans.}$$

(25) if  $A+B = 90^\circ$

$$\tan A \cdot \tan B = ?$$

$$\tan A \cdot \tan(90^\circ - A)$$

$$\tan A \cdot \cot A$$

$$\tan A \cdot \frac{1}{\tan A} = 1 \text{ Ans}$$

(26)  $\sin(3x-6) = \cos(6x-3)$

$$x = ?$$

$$\sin A = \cos B, \therefore A+B = 90^\circ$$

$$\therefore 3x-6+6x-3 = 90^\circ$$

$$9x = 99$$

$$\boxed{x=11}$$

यदि  $A+B = 90^\circ$

$$\text{तब } \sin^2 A + \sin^2 B = 1$$

$$\cos^2 A + \cos^2 B = 1$$

$$\sin A \cdot \sec B = 1$$

$$\cos A \cdot \csc B = 1$$

$$\tan A \cdot \tan B = 1$$

$$\cot A \cdot \cot B = 1$$

$$\sin A = \cos B$$

$$\tan A = \cot B$$

$$\csc A = \sec B$$

(27)  $\csc 51^\circ = x$

$$\frac{1}{\csc^2 51^\circ} + \sin^2 39^\circ + \tan^2 39^\circ = \frac{1}{\sin 51^\circ \sec 39^\circ}$$

$$\underbrace{\sin^2 51^\circ + \sin^2 39^\circ}_{\text{①}}$$

$$(\because 51+39=90)$$

$$\Rightarrow 1 + \tan^2 39 = 1$$

$$\Rightarrow \tan^2 39$$

$$\Rightarrow \tan^2 39 = \sec^2 39 - 1$$

$$\Rightarrow \boxed{x^2 - 1} \text{ Ans}$$

$$\begin{aligned} \csc 51^\circ &= x \\ \csc(90-39) &= x \\ \sec 39^\circ &= x \end{aligned}$$



$$[28] \cot 18^\circ \left[ \cos^2 68^\circ \cdot \cot 72^\circ + \frac{1}{\sec^2 22^\circ \cdot \tan 72^\circ} \right]$$

175

$$\Rightarrow \cot 18^\circ \left[ \cos^2 68^\circ \cdot \cot 72^\circ + \cos^2 22^\circ \cdot \cot 72^\circ \right]$$

$$\Rightarrow \underbrace{\cot 18^\circ \cdot \cot 72^\circ}_{(1)} \left[ \underbrace{\cos^2 68^\circ + \cos^2 22^\circ}_{(1)} \right]$$

$$\Rightarrow 1 \times 1 = 1 \text{ Ans}$$



$$[29] \sin^2 1^\circ + \sin^2 5^\circ + \dots + \sin^2 90^\circ$$

$$\sin^2 1^\circ + \sin^2 5^\circ + \sin^2 9^\circ + \dots + \sin^2 89^\circ + \sin^2 90^\circ$$

$$\text{No. of terms} = \frac{\text{आखिरी} - \text{पहली}}{d} + 1$$

$$= \frac{89-1}{4} + 1 = 23.$$

$$\text{जोड़} = \frac{23}{2} = 11\frac{1}{2}$$

$$\therefore 11\frac{1}{2} + \sin^2 90^\circ = 11\frac{1}{2} + 1 = \frac{25}{2} \text{ Ans.}$$

$$[30] \sin^2 10^\circ + \sin^2 20^\circ + \dots + \sin^2 90^\circ$$

$$\sin^2 10^\circ + \sin^2 80^\circ = 1 \quad C \because \sin^2 A + \sin^2 B = 1$$

$$\sin^2 20^\circ + \sin^2 70^\circ = 1 \quad \text{if } A+B=90^\circ$$

$$\sin^2 30^\circ + \sin^2 60^\circ = 1$$

$$\sin^2 40^\circ + \sin^2 50^\circ = 1$$

$$\sin^2 90^\circ = \frac{1}{5} \text{ Ans}$$



$$[OR] \sin^2 10^\circ + \sin^2 20^\circ + \dots + \sin^2 80^\circ + \sin^2 90^\circ$$

वहाँ तक प्रयोग देक्नी हैं जहाँ तक  $0_1 + 0_2$  का  $90^\circ$  का जोड़ बने

$$\text{Terms की संख्या} = \frac{80-10}{10} + 1 = 8$$

$$\text{इस सेण्टी का जोड़} = \frac{\text{no. of terms}}{2} = \frac{8}{2} = 4$$

$$\sin^2 90^\circ \text{ ज्ञेणी से अलग बचा है } \therefore \sin^2 90^\circ = 1$$

$$\therefore \text{ऊपर दी गई सेण्टी का कुल जोड़} = 4 + 1 = 5 \text{ Ans.}$$

(31)  $\cos^2 1 + \cos^2 3 + \dots + \cos^2 90$

$\cos^2 1 + \cos^2 3 + \cos^2 5 + \dots + \cos^2 89 + \cos^2 90$

$$n = \frac{89-1}{2} + 1 = 45$$

$$\text{जोड़} = \frac{45}{2} = 22\frac{1}{2}$$

$$\therefore \frac{45}{2} + \underbrace{\cos^2 90}_0 = \frac{45}{2} \text{ Ans}$$

इसे भाग इसलिए करते हैं क्योंकि 2 जोड़ों का योग 1 आयेगा

(32)  $\sin^2 \frac{\pi}{40} + \sin^2 \frac{2\pi}{40} + \sin^2 \frac{3\pi}{40} + \dots + \sin^2 \frac{20\pi}{40}$

$\sin^2 \frac{\pi}{40} + \sin^2 \frac{2\pi}{40} + \dots + \sin^2 \frac{19\pi}{40} + \sin^2 \frac{20\pi}{40}$

$$n = 19$$

$$\text{जोड़} = \frac{19}{2}$$

$$\therefore \frac{19}{2} + \sin^2 \frac{20\pi}{40}$$

$$\frac{19}{2} + \underbrace{\sin^2 90}_1 \Rightarrow \frac{19}{2} + 1 \Rightarrow \frac{21}{2} \text{ Ans}$$

$$\begin{aligned} & \textcircled{*} \quad \frac{\pi}{40} + \frac{19\pi}{40} \\ & \frac{\pi + 19\pi}{40} = \frac{20\pi}{40} \\ & = \frac{\pi}{2} \quad (90^\circ \text{ का pair बन रहा है}) \end{aligned}$$

(33) A, B, C किसी त्रिभुज के शीर्ष हैं।

$$\cos^2 \frac{A}{2} + \cos^2 \frac{B}{2} + \cos^2 \frac{C}{2} + \cos^2 \left(\frac{A+B}{2}\right) + \cos^2 \left(\frac{B+C}{2}\right) + \cos^2 \left(\frac{C+A}{2}\right) = ?$$

$$\cos^2 \left(\frac{A}{2}\right) + \cos^2 \left(\frac{B+C}{2}\right)$$

90° का pair बन रहा है।

$$\therefore \cos^2 A + \cos^2 B = 1. (\because A+B=90)$$

$$\therefore \cos^2 \frac{A}{2} + \cos^2 \frac{B+C}{2} = 1$$

ऐसे 3 pair हैं

$$\therefore 1+1+1 = 3 \text{ Ans}$$



#	$\cos(-\theta) = +\cos\theta$	$\csc(-\theta) = -\csc\theta$
	$\sin(-\theta) = -\sin\theta$	$\sec(-\theta) = +\sec\theta$
	$\tan(-\theta) = -\tan\theta$	$\cot(-\theta) = -\cot\theta$

---

(34) 
$$\frac{\cos(90+\alpha) \cdot \sec(360-\alpha) \tan(180-\alpha)}{\sec(\alpha-720) \cdot \sin(\alpha+540) \cdot \cot(\alpha-90)} = ?$$

$$\Rightarrow \frac{(-)\sin\alpha \cdot \sec\alpha \cdot (-)\tan\alpha}{\sec\alpha \cdot (-)\sin\alpha \cdot (-)\tan\alpha}$$

$\therefore \sin(540+\alpha) \rightarrow$  तीसरा घृणा.

$\therefore \sin \div (\text{Eve})$

$\Rightarrow 1 \underline{\text{Ans}}$

$$\begin{aligned} * \sec(\alpha-720) &= \sec(-(720-\alpha)) \\ &= \sec(720-\alpha) \\ &= \sec\alpha. \end{aligned}$$

$$\begin{aligned} * \cot(\alpha-90) &= \cot[-(90-\alpha)] \\ &= -\cot(90-\alpha) \\ &= -\tan\alpha. \end{aligned}$$

(35)  $x = y \cos \frac{2\pi}{3} = z \cos \frac{4\pi}{3}$   
 $xy + yz + zx = ?$

$$x = y \cos \frac{2\pi}{3} = z \cos \frac{4\pi}{3}$$

$$\Rightarrow \cos \frac{2\pi}{3} = \cos 120 = \cos(180-60) = -\cos 60 = -\frac{1}{2}$$

$$\Rightarrow \cos \frac{4\pi}{3} = \cos 240 = \cos(180+60) = -\cos 60 = -\frac{1}{2}$$

$$\therefore x = -\frac{y}{2} = -\frac{z}{2} = K$$

$$x = K \quad | \quad y = -2K \quad | \quad z = -2K$$

$$\begin{aligned} \therefore xy + yz + zx &= K(-2K) + (-2K)(-2K) + (-2K)K \\ &= -2K^2 + 4K^2 - 2K^2 = 0 \quad \underline{\text{Ans}} \end{aligned}$$

OR Put values.

$$x = 1 \quad | \quad \begin{array}{c} -\frac{y}{2} \\ y = -2 \end{array} \quad | \quad \begin{array}{c} -\frac{z}{2} \\ z = -2 \end{array}$$

$$\therefore xy + yz + zx = -2 \times 1 + (-2)(-2) + (-2) \times 1 \Rightarrow -2 + 4 - 2 = 0 \quad \underline{\text{Ans}}$$



36  $\sin(A+B-C) = \cos(A+C-B) = \tan(B+C-A) = 1$

$$A+B+C = ?$$

$\sin(A+B-C) = 1$ $\therefore \sin 90^\circ = 1$ $\therefore A+B-C = 90^\circ$	$\cos(A+C-B) = 1$ $\therefore \cos 0 = 1$ $\therefore A+C-B = 0$	$\tan(B+C-A) = 1$ $\tan 45 = 1$ $\therefore B+C-A = 45^\circ$
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$\Rightarrow A+\cancel{B}-\cancel{C} = 90^\circ$ $A+\cancel{C}-\cancel{B} = 0$ <hr/> $2A = 90^\circ$	$B+C-\cancel{A} = 45^\circ$ $\cancel{A}+C-\cancel{B} = 0$ $\frac{2C}{2C} = 45^\circ$	$A+C-B = 0$ $45 + \frac{45}{2} = B$ $\therefore B = \frac{135}{2}$
--	--	--

$A = 45^\circ$

$C = \frac{45}{2}$

$\therefore B = \frac{135}{2}$

---


$$\Rightarrow A+B+C = 45 + \frac{45}{2} + \frac{135}{2} = 135 \quad \underline{\text{Ans}}$$

37  $\frac{\tan 57 + \cot 37}{\tan 33 + \cot 53}$

- (A)  $\tan 33 \cdot \cot 53$ . (B)  $\tan 53 \cdot \cot 37$ .

(C)  $\tan 33 \cdot \cot 57$

(D)  $\tan 57 \cdot \cot 37$ .

$$\frac{\tan 57 + \cot 37}{\tan(90-57) + \cot 53}$$

$$\Rightarrow \tan 57 + \frac{1}{\tan 37}$$


---


$$\frac{1}{\cot 57 + \cot(90-53)}$$

$$\frac{\tan 57 + \frac{1}{\tan 37}}{\frac{1}{\tan 57} + \tan 37}$$

$$\Rightarrow \frac{(\tan 57 \cdot \tan 37) + 1}{\tan 37}$$

$$\Rightarrow \frac{1}{\tan 37} \times \tan 57$$

---


$$\frac{(\tan 57 \cdot \tan 37) + 1}{\tan 57}$$

$$\Rightarrow \tan 57 : \cot 37 \quad \underline{\text{Ans}}$$

38  $\tan 40 + 2 \tan 10 = ?$

- (A)  $\tan 40$  (B)  $\cot 40$

$$40+10=50$$

$$\tan(40+10) = \tan 50$$

- (C)  $\sin 40$  (D)  $\cos 40$

$$\frac{\tan 40 + \tan 10}{1 - \tan 40 \tan 10} = \tan 50$$

$$\star \tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \cdot \tan B}$$

$$\tan 40 + \tan 10 = \tan 50 - \underbrace{\tan 50 \cdot \tan 40 \cdot \tan 10}_{\textcircled{1}}$$

( $\because \tan A \cdot \tan B = 1 \text{ if } A+B=90^\circ$ )

$$\Rightarrow \tan 40 + \tan 10 = \tan 50 - \tan 10$$

$$\Rightarrow \tan 40 + \tan 10 = \tan 50$$

$$= \tan(90-40)$$

$$= \cot 40 \quad \underline{\text{Ans.}}$$



#

$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \cdot \tan B}$$

$$\tan(45+\theta) = \frac{1+\tan\theta}{1-\tan\theta} = \frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta}$$

$$\tan(45-\theta) = \frac{1-\tan\theta}{1+\tan\theta} = \frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta}$$

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

• 39

$$\frac{\cos 15 - \sin 15}{\cos 15 + \sin 15} = ?$$

$$\Rightarrow \tan(45-15)$$

$$\Rightarrow \tan 30^\circ = \frac{1}{\sqrt{3}} \quad \underline{\text{Ans}}$$



#

$$\sin\theta \cdot \sin(60-\theta) \cdot \sin(60+\theta) = \frac{1}{4} \sin 3\theta$$

$$\cos\theta \cdot \cos(60-\theta) \cdot \cos(60+\theta) = \frac{1}{4} \cos 3\theta$$

$$\tan\theta \cdot \tan(60-\theta) \cdot \tan(60+\theta) = \tan 3\theta$$

40]  $\sin 20^\circ \sin 40^\circ \sin 80^\circ = ?$

180

$$\Rightarrow \frac{1}{4} \sin 30^\circ \Rightarrow \frac{1}{4} \sin 60^\circ \Rightarrow \frac{1}{4} \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{8} \text{ Ans}$$


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41]

$$\cos 12^\circ \cos 24^\circ \cdot \cos 36^\circ \cdot \cos 48^\circ \cos 60^\circ \cos 72^\circ \cdot \cos 84^\circ = ?$$

$$\Rightarrow \frac{1}{4} \cos 3\theta \times \frac{1}{4} \cos 3\phi \times \cos 60^\circ \quad \cos 36 = \frac{\sqrt{5}+1}{4}$$

$$\Rightarrow \frac{1}{4} \cos(3 \times 12) + \frac{1}{4} \cos(3 \times 24) \times \cos 60^\circ \quad \cos 72 = \frac{\sqrt{5}-1}{4}$$

$$\Rightarrow \frac{1}{4} \cos 36^\circ + \frac{1}{4} \cos 72^\circ \times \cos 60^\circ$$

$$\Rightarrow \frac{1}{4} \times \frac{(\sqrt{5}+1)}{4} + \frac{1}{4} \times \frac{(\sqrt{5}-1)}{4} \times \frac{1}{2}$$

$$\Rightarrow \frac{1}{4} \times \frac{(\sqrt{5})^2 - (1)^2}{4 \times 4} \times \frac{1}{4} \times \frac{1}{2}$$

$$\Rightarrow \frac{1}{4} \times \frac{4}{4 \times 4} \times \frac{1}{4} \times \frac{1}{2} = \frac{1}{128} \text{ Ans}$$



42]  $\sin \frac{\pi}{9} \cdot \sin \frac{5\pi}{9} \cdot \sin \frac{7\pi}{9} \cdot \sin \frac{3\pi}{9}$

$$\Rightarrow \sin 20^\circ \cdot \sin 100^\circ \cdot \sin 140^\circ \cdot \sin 60^\circ$$

$$\Rightarrow \sin 20^\circ \cdot \sin(180-80^\circ) \cdot \sin(180-40^\circ) \cdot \frac{\sqrt{3}}{2}$$

$$\Rightarrow \sin 20^\circ \cdot \sin 80^\circ \cdot \sin 40^\circ \cdot \frac{\sqrt{3}}{2}$$

$$\Rightarrow \frac{1}{4} \sin 30^\circ \cdot \frac{\sqrt{3}}{2} \Rightarrow \frac{1}{4} \sin 60^\circ \cdot \frac{\sqrt{3}}{2}$$

$$\Rightarrow \frac{1}{4} \times \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} \Rightarrow \frac{3}{16} \text{ Ans.}$$

(43)  $\frac{\sin 2x}{\sin \frac{x}{4}}$

$$\sin 2\theta = 2\sin \theta \cos \theta$$

$$\Rightarrow 2\sin x \cos x \Rightarrow 2\sin 2\left(\frac{x}{2}\right) \cdot \cos x \Rightarrow 4\sin \frac{x}{2} \cdot \cos \frac{x}{2} \cdot \cos x$$

$$\Rightarrow 4\sin^2\left(\frac{x}{2}\right) \cdot \cos \frac{x}{2} \cdot \cos x$$

$$\Rightarrow \frac{4 \times 2 \sin \frac{x}{4} \cdot \cos \frac{x}{4} \cdot \cos \frac{x}{2} \cdot \cos x}{\sin \frac{x}{4}}$$

$$\Rightarrow 8 \cos \frac{x}{4} \cdot \cos \frac{x}{2} \cdot \cos x \quad \underline{\text{Ans}}$$



**OR** ये कैसों formula कितनी बार Apply किया हैं।

$2x$  से  $x$  पर गाएँ

$x$  से  $\frac{x}{2}$  पर गाएँ

$\frac{x}{2}$  से  $\frac{x}{4}$  पर गाएँ

3 बार

स्फुरण बार  $\cos \frac{x}{4}$  बचेगा

स्फुरण बार  $\cos \frac{x}{2}$  बचेगा

और  $\cos x$  बचेगा।

$$\therefore 2 \times 2 \times 2 \times \cos \frac{x}{4} \cdot \cos \frac{x}{2} \cdot \cos x \quad \underline{\text{Ans}}$$

(44)  $\frac{\sin x}{\sin \frac{x}{16}}$

$$\Rightarrow 2 \times 2 \times 2 \times 2 \cdot \cos \frac{x}{2} \cdot \cos \frac{x}{4} \cdot \cos \frac{x}{8} \cdot \cos \frac{x}{16}$$

$$\Rightarrow 16 \cdot \cos \frac{x}{2} \cdot \cos \frac{x}{4} \cdot \cos \frac{x}{8} \cdot \cos \frac{x}{16} \quad \underline{\text{Ans}}$$

(45) if  $A+B=\frac{\pi}{4}$  तब  $(\cot A-1)(\cot B-1)=?$

$$A+B=\frac{\pi}{4}$$

$$\cot(A+B)=\cot\left(\frac{\pi}{4}\right)$$

$$\cot(A+B)=\cot 45^\circ$$

$$\Rightarrow \frac{\cot A \cot B - 1}{\cot A + \cot B} \cancel{\times} \frac{1}{1}$$

$$\Rightarrow \cot A \cot B - 1 = \cot A + \cot B$$

$$\Rightarrow \cot A \cot B - 1 - \cot A - \cot B = 0$$

$$\Rightarrow \cot A [\cot B - 1] - 1 - \cot B + 1 - 1 = 0$$

$$\Rightarrow \cot A [\cot B - 1] - 1 [\cot B - 1] = 2$$

$$\Rightarrow (\cot A - 1)(\cot B - 1) = 2 \text{ Ans}$$

(46) पर्याप्ति  $A+B+C=180^\circ$ ,  $\tan A + \tan B + \tan C = ?$

$$A+B = 180^\circ - C$$

$$\tan(A+B) = \tan(180^\circ - C)$$

$$\Rightarrow \frac{\tan A + \tan B}{1 - \tan A \tan B} = -\frac{\tan C}{1}$$

$$\Rightarrow \tan A + \tan B = -\tan C + \tan A \tan B \tan C$$

$$\Rightarrow i) \tan A + \tan B + \tan C = \tan A \cdot \tan B \cdot \tan C$$

$$ii) \frac{1}{\tan B \cdot \tan C} + \frac{1}{\tan A \cdot \tan C} + \frac{1}{\tan A \cdot \tan B} = 1$$

$$iii) \cot A \cot B + \cot B \cot C + \cot C \cot A = 1$$

(47)  $1 + \sin x + \sin^2 x + \sin^3 x + \dots \dots \dots \infty = 4 + 2\sqrt{3} \quad | x=?$

$$s\infty = \frac{a}{f(x)} \quad (4P सेवी)$$

$$\Rightarrow \frac{1}{1 - \sin x} = 4 + 2\sqrt{3} \times \frac{(4 - 2\sqrt{3})}{(4 + 2\sqrt{3})}$$

$$\Rightarrow \frac{1}{1 - \sin x} = \frac{4}{4 - 2\sqrt{3}}$$

$$\Rightarrow \frac{1}{1 - \sin x} = \frac{\frac{4}{4}}{\frac{4}{4} - \frac{2\sqrt{3}}{4}} \quad (4 से भाग)$$

$$\Rightarrow \frac{1}{1-\sin x} = \frac{1}{1-\frac{\sqrt{3}}{2}}$$

comparing both sides

$$\sin x = \frac{\sqrt{3}}{2}$$

$$\sin x = \sin 60^\circ$$

$$x = 60^\circ \quad \text{Ans}$$

$$(48) \sin^2(40+2x) + \sin^2(50-2x) = ?$$

$$40+2x+50-2x=90$$

$$\therefore \sin^2(40+2x) + \sin^2(50-2x) = 1 \quad \underline{\text{Ans}}$$

$$(49) \cos 15^\circ \cdot \cos 7\frac{1}{2}^\circ \cdot \sin 7\frac{1}{2}^\circ = ?$$

$$\Rightarrow \cos 15^\circ \cdot \frac{1}{2} [2 \cos 7\frac{1}{2}^\circ \cdot \sin 7\frac{1}{2}^\circ]$$

$$\Rightarrow \frac{1}{2} \cos 15^\circ \times \sin 2^\circ \cdot \frac{15}{2}$$

$$\Rightarrow \frac{1}{2 \times 2} \times 2 \sin 15^\circ \cdot \cos 15^\circ$$

$$\Rightarrow \frac{1}{4} \sin 30^\circ \Rightarrow \frac{1}{4} \times \frac{1}{2} = \frac{1}{8} \quad \underline{\text{Ans}}$$



$$(50) \cos 20^\circ \cdot \cos 40^\circ \cdot \cos 60^\circ \cdot \cos 80^\circ = ?$$

$$\Rightarrow \frac{1}{4} \cos 3 \times 20^\circ \cdot \cos 60^\circ \cdot \Rightarrow \frac{1}{4} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16} \quad \underline{\text{Ans}}$$

$$(51) \sin 12^\circ \cdot \sin 48^\circ \cdot \sin 54^\circ = ?$$

$$\sin 12^\circ \cdot \sin 48^\circ \cdot \sin 72^\circ \times \frac{1}{\sin 72^\circ} \times \sin 54^\circ$$

$$\Rightarrow \frac{1}{4} \sin 3 \times 12^\circ \times \frac{1}{\sin 72^\circ} \times \sin (90 - 36^\circ)$$

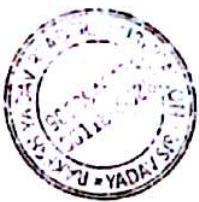
$$\Rightarrow \frac{1}{4} \sin 36^\circ \times \cos 36^\circ \times \frac{1}{\sin 72^\circ}$$

$$\Rightarrow \frac{1}{4 \times 2} \cdot 2 \sin 36 \cos 36 \times \frac{1}{\sin 72}$$

184

$$\Rightarrow \frac{1}{8} \sin 72 \times \frac{1}{\sin 72} = \frac{1}{8} \text{ Ans}$$

## MAXIMA & MINIMA



min  
(न्यूनतम)

max  
(अधिकतम)

$\sin \theta, \cos \theta$  (विषम धात) -1 +1

$\sin^2 \theta, \cos^2 \theta$  (सम धात) 0 +1

$\tan \theta, \cot \theta$  (विषम धात) -∞ +∞

$\tan^2 \theta, \cot^2 \theta$  (सम धात) 0 +∞

$\sec \theta, \cosec \theta$  (विषम धात) -∞ +∞

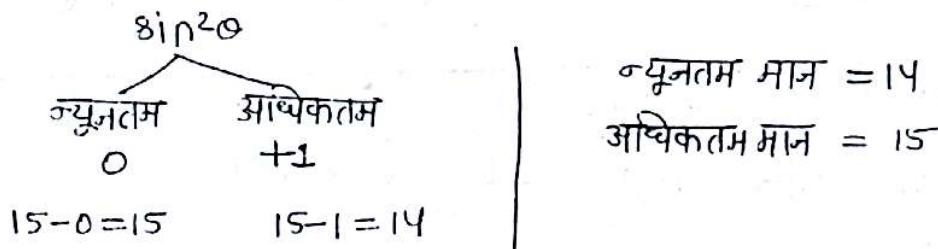
$\sec^2 \theta, \cosec^2 \theta$  (सम धात) +1 +∞

52]  $15 + \sin^2 \theta$  का अधिकतम व न्यूनतम मान ज्ञात करो।

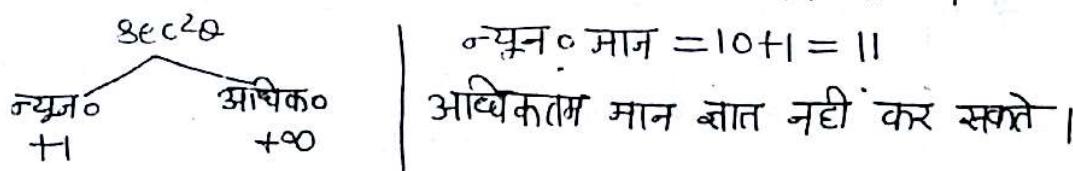
$$\text{न्यूनतम मान} = 15 + 0 = 15$$

$$\text{अधिकतम मान} = 15 + 1 = 16$$

53]  $15 - \sin^2 \theta$  की आधिकतम व न्यूनतम मान ज्ञात करो।



54]  $10 + \sec^2 \theta$  न्यूनतम व अधिकतम मान ज्ञात करो।

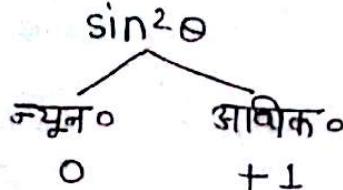


55.  $15 \sin^2\theta + 10 \cos^2\theta$  की न्यूनतम व अधिकतम मान ज्ञात करो।

$$\Rightarrow 15 \sin^2\theta + 10(1 - \sin^2\theta)$$

$$\Rightarrow 15 \sin^2\theta + 10 - 10 \sin^2\theta$$

$$\Rightarrow 10 + 5 \sin^2\theta$$



$$10+0 = 10 \rightarrow \text{न्यूनतम मान}$$

$$10+5 = 15 \rightarrow \text{अधिकतम मान}$$

#

$$a \sin^2\theta + b \cos^2\theta$$

यदि  $a > b$ अधिका० =  $a$ न्यूना० =  $b$ यदि  $a < b$ आधिका० =  $b$ न्यूना० =  $a$ 

#

$$\sin^n\theta \cdot \cos^n\theta$$

$$\text{अधिकतम} = \frac{1}{2^n}$$

यदि  $n \rightarrow \text{सम}$ 

न्यूनतम = 0

यदि  $n \rightarrow \text{विषम}$ न्यूनतम =  $-\frac{1}{2^n}$ 

56.  $\sin^{11}\theta \cdot \cos^{11}\theta$  अधिकतम व न्यूनतम मान ज्ञात करो।

$$\text{अधिकतम} = \frac{1}{2^{11}}$$

$$\text{न्यूनतम} = 0 \quad (\because n \rightarrow \text{सम})$$

57.  $\sin^5\theta \cdot \cos^5\theta$  . न्यूनतम मान ज्ञात करो।

$$\text{न्यूनतम} = -\frac{1}{2^5} = -\frac{1}{32} \text{ Ans}$$

58.  $\sin^8\theta + \cos^{14}\theta$ , अधिकतम मान=?

$$\text{अधिकतम मान} = 1$$

#

$$\sin^{2n}\theta + \cos^{2m}\theta$$

$$\text{अधिकतम} = 1$$

59.  $\sin^6\theta + \cos^6\theta$ , अधिकतम मान=?

$$\text{अधिकतम मान} = 1$$

#

$$\sin^4 \theta + \cos^4 \theta = 1 - 2 \sin^2 \theta \cdot \cos^2 \theta$$

$$\sin^6 \theta + \cos^6 \theta = 1 - 3 \sin^2 \theta \cos^2 \theta$$

(60)  $\sin^4 \theta + \cos^4 \theta$  . अधिकतम व न्यूनतम मान क्या होगा.

$$\sin^4 \theta + \cos^4 \theta = 1 - 2 \sin^2 \theta \cos^2 \theta$$

$$\Rightarrow 1 - 2(0) = 1$$

$$\text{और} \Rightarrow 1 - 2\left(\frac{1}{4}\right)$$

$$1 - \frac{1}{2} = \frac{1}{2}$$

$$\text{न्यूनतम मान} = \frac{1}{2}$$

$$\text{अधिकतम मान} = 1$$

$$\begin{array}{c} \sin^2 \theta \cos^2 \theta \\ \text{न्यून} \quad \text{अधिक} \\ = 0 \quad \quad \quad = \frac{1}{2} \\ \quad \quad \quad = \frac{1}{4} \end{array}$$

By Pardeep Chhoker

7206446517



#

$$\sin^{2n} \theta + \cos^{2m} \theta$$

$$\text{अधिकतम} = +1$$

$$\text{न्यूनतम} = \text{put } \theta = 45^\circ$$

#

$$a \sin \theta + b \cos \theta$$

$$\text{अधिकतम} = + \sqrt{a^2 + b^2}$$

$$\text{न्यूनतम} = - \sqrt{a^2 + b^2}$$

(61)  $\sin^2 \theta + \cos^4 \theta$  अधिकतम तथा न्यूनतम मान ज्ञात करो।

$$\text{अधिकतम} = 1$$

$$\text{न्यूनतम} = \text{put } \theta = 45^\circ$$

$$= \sin^2 45^\circ + \cos^4 45^\circ$$

$$= \left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^4 \Rightarrow \frac{1}{2} + \frac{1}{4} \Rightarrow \frac{3}{4} \text{ Ans}$$

(62)  $\sin^6 \theta + \cos^6 \theta$ , अधिकतम व न्यूनतम मान ज्ञात करो।

$$\text{अधिकतम} = 4$$

$$\text{न्यूनतम} = \left(\frac{1}{\sqrt{2}}\right)^6 + \left(\frac{1}{\sqrt{2}}\right)^6$$

$$\text{Put } \theta = 45^\circ$$

$$= \left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^3 \Rightarrow \frac{1}{4} \text{ Ans}$$

(63)  $3\sin\theta + 4\cos\theta$  . न्यूनतम मान ज्ञात करो।

$$-\sqrt{3^2+4^2} = -5 \text{ Ans}$$

(64)  $27\sin\theta \times 81\cos\theta$  अधिकतम व न्यूनतम मान ज्ञात करो।

$$\Rightarrow 3^3\sin\theta \times 3^4\cos\theta$$

$$\Rightarrow 3(3\sin\theta + 4\cos\theta)$$

$$* 3\sin\theta + 4\cos\theta$$

$$\text{अधिकतम} = \sqrt{3^2+4^2} = 5$$

$$\text{न्यूनतम} = -5$$

$$\therefore \text{अधिकतम} = 3^5$$

$$\text{न्यूनतम} = 3^{-5} \text{ Ans}$$

(65)  $10\sin\theta \cdot \cos\theta + 1 - 2\sin^2\theta$  . अधिकतम व न्यूनतम मान ज्ञात करो।

$$\Rightarrow 5 \times 2\sin\theta\cos\theta + 1 - 2\sin^2\theta$$

$$\# \cos 2\theta = \cos^2\theta - \sin^2\theta$$

$$\Rightarrow 5\sin 2\theta + 1 \cos 2\theta$$

$$= 2\cos^2\theta - 1$$

$$\text{अधिकतम} = +\sqrt{5^2+1^2} = +\sqrt{26}$$

$$= 1 - 2\sin^2\theta$$

$$\text{न्यूनतम} = -\sqrt{26}$$

$$= \frac{1 - \tan^2\theta}{1 + \tan^2\theta}$$

$$1 + \cos 2\theta = 2\cos^2\theta$$



(66)  $4\tan^2\theta + 25\cot^2\theta$  . न्यूनतम मान ज्ञात करो।

$$\text{न्यूनतम मान} = \sqrt{4 \times 25}$$

#

$$= \sqrt{100}$$

$$= 20 \text{ Ans}$$

$$a\tan^2\theta + b\cot^2\theta$$

$$\text{न्यूनतम} = \sqrt{ab}$$

$$\text{अधिकतम} = \infty$$

(67)  $4\sec^2\theta + 25\csc^2\theta$  . न्यूनतम मान क्या होगा ?

$$\Rightarrow 4(1 + \tan^2\theta) + 25(1 + \cot^2\theta)$$

$$\Rightarrow 4 + 4\tan^2\theta + 25 + 25\cot^2\theta$$

$$\Rightarrow 29 + 4\tan^2\theta + 25\cot^2\theta$$

$$29 + 20 = 49 \text{ Ans}$$

$$\text{न्यूनतम} = 20$$

#

$$a \sin^2 \theta + b \cosec^2 \theta$$

if  $a < b$   
 $\text{न्यूनतम} = a+b$   
 if  $a > b$   
 $\text{न्यूनतम} = \sqrt{ab}$

$$a \cos^2 \theta + b \sec^2 \theta$$

if  $a < b$   
 $\text{न्यूनतम} = a+b$   
 if  $a > b$   
 $\text{न्यूनतम} = \sqrt{ab}$

(68)  $4 \sin^2 \theta + 25 \cosec^2 \theta$ . न्यूनतम मान ज्ञात करो

$$\text{न्यूनतम मान} = 4+25 = 29$$

(69)  $4 \cosec^2 \theta + 25 \sin^2 \theta$ . न्यूनतम मान ज्ञात करो।

$$\text{न्यूनतम मान} = \sqrt{4 \times 25} = 20$$

(70)  $25 \cosec^2 \theta + 25 \sin^2 \theta$ . न्यूनतम मान ज्ञात करो

$\sqrt{25 \times 25}$ $25+25$ $= 50 \text{ Ans}$	<u>or</u> $25+25$ $= 50 \text{ Ans}$
--	---

(71)  $\sin^2 \theta + \cosec^2 \theta$ . न्यूनतम मान ज्ञात करो

$$\text{न्यूनतम} = 1+1 = 2$$

(72)  $\cos^2 \theta + \sec^2 \theta$ . न्यूनतम मान ज्ञात करो.

$$1+1 = 2 \text{ Ans} //$$

(73)  $\tan^2 \theta + \cot^2 \theta$ . न्यूनतम मान ज्ञात करो।

$$= \sqrt{1+1} = \sqrt{2} \text{ Ans}$$

(74)  $\underbrace{\sin^2 \theta + \cosec^2 \theta}_{1} + \cos^2 \theta + \sec^2 \theta + \tan^2 \theta + \cot^2 \theta$ . न्यूनतम मान = ?

$$\Rightarrow 1+1+\cot^2 \theta + 1+\tan^2 \theta + \tan^2 \theta + \cot^2 \theta$$

$$\Rightarrow 3+2 \cdot \tan^2 \theta + 2 \cdot \cot^2 \theta$$

$$\Rightarrow 3+2\sqrt{2 \times 2}$$

$$\Rightarrow 3+4 = 7 \text{ Ans}$$

$$* \cosec^2 \theta = 1+\cot^2 \theta$$

$$* \sec^2 \theta = 1+\tan^2 \theta$$

CLASS  
69

By Pandeep Chhoker  
7206446517

#

$$\frac{1}{\cos^2 \theta} = \frac{1 + \tan^2 \theta}{1 - \tan^2 \theta}$$

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

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

# value putting

i)  $\sin, \cos$  हो तो  $\theta = 0^\circ, 90^\circ$

रख कर देखो

ii)  $\sin, \cos, \tan$  हो तो  $\theta = 45^\circ$  शर्कारी

हर में zero (0) नहीं बनना चाहिए

[75]  $(1 - 2\sin^2 \theta) \left[ \frac{1 + \tan \theta}{1 - \tan \theta} + \frac{1 - \tan \theta}{1 + \tan \theta} \right]$  का मान ज्ञात करो।

$$\cos^2 \theta \left[ \frac{(1 + \tan \theta)^2 + (1 - \tan \theta)^2}{(1 - \tan \theta)(1 + \tan \theta)} \right]$$

$$\cos^2 \theta \left[ \frac{2(1 + \tan^2 \theta)}{(1 - \tan^2 \theta)} \right]$$

$$\cos^2 \theta \times 2 \cdot \frac{1}{\cos^2 \theta} = 2 \text{ Ans}$$

[OR] put  $\theta = 0^\circ$

$$1 \left[ \frac{1}{1} + \frac{1}{1} \right] = 2 \text{ Ans}$$

[76]  $\sqrt{2 + \sqrt{2 + 2\cos 4\theta}}$

A)  $2\tan \theta$  B)  $2\sin \theta$

C)  $2\cos \theta$  D)  $\cos \theta$

$$= \sqrt{2 + \sqrt{2(1 + \cos 4\theta)}}$$

$$= \sqrt{2 + \sqrt{2 \times 2\cos^2 2\theta}}$$

$$= \sqrt{2 + 2\cos 2\theta}$$

$$= \sqrt{2(1 + \cos 2\theta)}$$

$$= \sqrt{2 \times 2\cos^2 \theta}$$

$$= 2\cos \theta \text{ Ans}$$

[OR] put  $\theta = 0^\circ$

$$\sqrt{2 + \sqrt{2+2}} = \sqrt{4} = 2$$

विकल्प C satisfies.

(77) यदि  $x = \sin\theta + \cos\theta$   
 $y = \sec\theta + \csc\theta$

$y = \frac{1}{\cos\theta} + \frac{1}{\sin\theta}$

$y = \frac{\sin\theta + \cos\theta}{\cos\theta \cdot \sin\theta}$

$y = \frac{2(\sin\theta + \cos\theta)}{2\sin\theta \cos\theta}$

$y = \frac{2x}{x^2 - 1}$

190

- A)  $\frac{2x}{x^2 - 1}$   
 B)  $\frac{2x}{x^2 + 1}$   
 C)  $\frac{x}{x^2 + 1}$   
 D)  $\frac{x}{x^2 - 1}$

$$x^2 = \sin^2\theta + \cos^2\theta + 2\sin\theta \cos\theta$$

$$x^2 - 1 = 2\sin\theta \cos\theta$$

[OR] put  $\theta = 45^\circ$

$$x = \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} = \sqrt{2}$$

$$y = \sqrt{2} + \sqrt{2} = 2\sqrt{2}$$

option A. satisfies.

(78)  $(1 + \csc\theta + \cot\theta)(1 - \sec\theta + \tan\theta) = ?$

$$\Rightarrow \left(1 + \frac{1}{\sin\theta} + \frac{\cos\theta}{\sin\theta}\right) \left(1 - \frac{1}{\cos\theta} + \frac{\sin\theta}{\cos\theta}\right)$$

$$\Rightarrow \left(\frac{\sin\theta + 1 + \cos\theta}{\sin\theta}\right) \left(\frac{\cos\theta - 1 + \sin\theta}{\cos\theta}\right)$$

$$\Rightarrow \frac{[(\sin\theta + \cos\theta) + 1][(1 - \sin\theta + \cos\theta) - 1]}{\sin\theta \cdot \cos\theta}$$

$$\Rightarrow \frac{(\sin\theta + \cos\theta)^2 - 1^2}{\sin\theta \cdot \cos\theta} \Rightarrow \frac{1 + 2\sin\theta \cos\theta - 1}{\sin\theta \cos\theta}$$

$$\Rightarrow \frac{2\sin\theta \cos\theta}{\sin\theta \cos\theta} = 2 \quad \text{Ans}$$

[OR]  
 put  $\theta = 45^\circ$   
 $(2 + \sqrt{2})(2 - \sqrt{2})$   
 $\Rightarrow 4 - 2$   
 $\Rightarrow 2 \quad \text{Ans}$

(79)  $U_n = \cos^n\theta + \sin^n\theta$ ,  $2U_6 - 3U_4 + 1$  का मान ज्ञात करो।

$$\Rightarrow 2(\cos^6\theta + \sin^6\theta) - 3(\cos^4\theta + \sin^4\theta) + 1$$

$$\Rightarrow 2[1 - 3\sin^2\theta \cos^2\theta] - 3[1 - 2\sin^2\theta \cos^2\theta] + 1$$

$$\Rightarrow 2 - 6\sin^2\theta \cos^2\theta - 3 + 6\sin^2\theta \cos^2\theta + 1 \Rightarrow 0 \quad \text{Ans}$$

(OR) Put  $\theta = 0$

$$2(1+0) - 3(1+0) + 1 \Rightarrow 2-3+1=0 \text{ Ans}$$

(80) यदि  $\tan^2 \theta = 1-e^2$       A)  $(2-e^2)^{3/2}$       B)  $(2-e^2)^{1/2}$

$\sec \theta + \tan^3 \theta \cdot \csc \theta = ?$       C)  $(1-e^2)^{1/2}$       D)  $(1+e^2)^{5/2}$

$$\frac{1}{\cos \theta} + \frac{\sin^3 \theta}{\cos^3 \theta} \cdot \frac{1}{\sin \theta}$$

$$\Rightarrow \frac{\cos^2 \theta + \sin^2 \theta}{\cos^3 \theta} \Rightarrow \frac{1}{\cos^3 \theta} = \sec^3 \theta$$

$$\Rightarrow \sec^3 \theta = 1 + \tan^2 \theta \\ = 1 + 1 - e^2$$

$$\sec^2 \theta = 2 - e^2$$

$$\sec^3 \theta = (2-e^2)^{3/2} \text{ Ans.}$$

[OR] put  $\theta = 45^\circ$

$$\sqrt{2} + 1 \times \sqrt{2}$$

$$\sqrt{2} + \sqrt{2} \Rightarrow 2\sqrt{2}$$

$$= 2^{1/2} \cdot 2^{1/2} \Rightarrow 2^{3/2}$$

$$\tan^2 \theta = 1 - e^2$$

$$1 = 1 - e^2$$

$e^2 = 0 \rightarrow$  put in options

option A satisfies.

(81)  $x \sin^3 \theta + y \cos^3 \theta = (4) \sin \theta \cos \theta$  इसका कर्ण Ans होगा

$$\Rightarrow x \sin \theta \cdot \sin^2 \theta + y \cos \theta \cdot \cos^2 \theta = 4 \sin \theta \cos \theta$$

$$\Rightarrow y \cos \theta \cdot \sin^2 \theta + y \cos^3 \theta = 4 \sin \theta \cdot \cos \theta$$

$$\cos \theta (y \sin^2 \theta + y \cos^2 \theta) = 4 \sin \theta \cos \theta$$

$$\Rightarrow y(\sin^2 \theta + \cos^2 \theta) = 4 \sin \theta$$

$$\boxed{y = 4 \sin \theta}$$

$$\begin{array}{l|l} x \sin \theta - y \cos \theta = 0 & x^2 + y^2 = ? \\ \downarrow & \cos \theta \neq 0 \\ x \sin \theta = y \cos \theta & \sin \theta \neq 0 \end{array}$$

$\downarrow$   
y का मान रखो

$$x \sin \theta = 4 \sin \theta \cdot \cos \theta$$

$$\boxed{x = 4 \cos \theta}$$

$$\begin{aligned} \therefore x^2 + y^2 &= 16 \cos^2 \theta + 16 \sin^2 \theta \\ &= 16(\sin^2 \theta + \cos^2 \theta) \\ &= 16 \text{ Ans} \end{aligned}$$

[OR] put  $\theta = 45^\circ$

$$x \sin \theta = y \cos \theta$$

$$\boxed{x=y}$$

$$\frac{x}{2\sqrt{2}} + \frac{y}{2\sqrt{2}} = 4 \times \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}$$

$$\frac{x+y}{\sqrt{2}} = 4$$

$$x+y = 4\sqrt{2}$$

$$\begin{array}{l} 2y = 4\sqrt{2} \\ y = 2\sqrt{2} \end{array}$$

$$\therefore x = 2\sqrt{2}$$

$$\begin{array}{l} x^2 + y^2 = \\ (2\sqrt{2})^2 + (2\sqrt{2})^2 \\ = 8 + 8 = 16 \text{ Ans} \end{array}$$

- 82 A, B, C किसी त्रिभुज के कोण हैं जो समानान्तर सेणी (A.P) में है।  $\frac{\sin A - \sin C}{\cos C - \cos A} = ?$

- (A)  $\sin B$     (B)  $\tan B$   
 (C)  $\cot B$     (D)  $\tan(\frac{A+B}{2})$

A    B    C  
 30    60    90

$$\frac{\sin 30 - \sin 90}{\cos 90 - \cos 30} = \frac{1 - \frac{1}{2}}{0 - \frac{\sqrt{3}}{2}} \Rightarrow \frac{1}{\sqrt{3}} \rightarrow \text{option C satisfies.}$$


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- 83  $a = \csc \theta - \sin \theta$      $a^2 b^2 (a^2 + b^2 + 3) = ?$

$$b = \sec \theta - \cos \theta$$

$$\text{Put } \theta = 45^\circ$$

$$a = \sqrt{2} - \frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$b = \sqrt{2} - \frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$\begin{aligned} & \frac{1}{2} \cdot \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} + 3 \right) \\ & \frac{1}{4} \times 4 \\ & = 1 \quad \underline{\text{Ans.}} \end{aligned}$$


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- 84  $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = ?$

- (A)  $\frac{1 + \sin \theta}{\cos \theta}$     (B)  $\frac{1 + \cos \theta}{\sin \theta}$

- (C)  $\frac{2}{\cos \theta}$     (D)  $2 \tan \theta$ .

$\theta = 0^\circ, 90^\circ$  पर इस यारदा है

$\theta = 45^\circ$  पर option A और B contradict करेंगे

so, put  $\theta = 30^\circ$

$$\frac{\frac{1}{2} - \frac{\sqrt{3}}{2} + 1}{\frac{1}{2} + \frac{\sqrt{3}}{2} - 1} \Rightarrow \sqrt{3}$$

option A satisfies

$$\frac{1 + \frac{1}{2}}{\frac{\sqrt{3}}{2}} \Rightarrow \sqrt{3}$$


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- 85  $a = \frac{\cos \alpha}{\cos \beta}$ ,  $b = \frac{\sin \alpha}{\sin \beta}$

$\sin^2 \beta$  का मान ज्ञात करें

- (A)  $\frac{a^2 + 1}{a^2 - b^2}$     (B)  $\frac{a^2 - 1}{a^2 + b^2}$

- (C)  $\frac{a^2 - 1}{a^2 + b^2}$     (D)  $\frac{a^2 - b^2}{a^2 + b^2}$

$$a^2 = \frac{\cos^2 \alpha}{\cos^2 \beta} \quad | \quad b^2 = \frac{\sin^2 \alpha}{\sin^2 \beta}$$

$$\cos^2 \alpha = a^2 \cos^2 \beta$$

$$+ \quad \sin^2 \alpha = b^2 \sin^2 \beta$$

$$1 = a^2(1 - \sin^2 \beta) + b^2 \sin^2 \beta$$

$$1 = a^2 - a^2 \sin^2 \beta + b^2 \sin^2 \beta$$

$$1 - a^2 = -\sin^2 \beta (a^2 - b^2)$$

$$-\sin^2 \beta = \frac{a^2 - b^2}{1 - a^2} \Rightarrow \sin^2 \beta = \frac{a^2 - 1}{a^2 - b^2} \quad \underline{\text{Ans.}}$$

By Pandeep Chhoker

7206446517

## Radian (रेडियन)

④  $\pi$  रेडियन =  $180^\circ$   
( $\pi^c$ )

$$1^c = \frac{180^\circ}{\pi} = \frac{90}{\frac{180^\circ}{\pi} \times \frac{7}{22}} = \frac{55}{80} = \frac{7}{11}$$

$$1^c = \frac{630^\circ}{11} = 57^\circ 16' 21''$$

$$11 \overline{)630^\circ} 57'$$

$$\begin{array}{r} 55 \\ 80 \\ \hline 77 \\ 3 \times 60 = 180^\circ \end{array}$$

86]  $\frac{5}{3}\pi^c$  को डिग्री में बदलो

$$\frac{5}{3} \times \frac{180^\circ}{\pi} = 300^\circ$$

$$11 \overline{)180^\circ} 16'$$

$$\begin{array}{r} 11 \\ 70 \\ 66 \\ \hline 4 \times 60 = 240^\circ \end{array}$$

87]  $\frac{4\pi}{15}^c$  को डिग्री में बदलो

$$\frac{4\pi}{15} \times \frac{180^\circ}{\pi} = 48^\circ$$

$$11 \overline{)240^\circ} 21'$$

$$\begin{array}{r} 22 \\ 20 \\ 11 \\ \hline 9 \end{array}$$

88]  $11 \frac{1}{5} \cdot \left(\frac{1}{6}\right)^c$ . डिग्री में बदलो

$$\frac{1}{6} \times \frac{180^\circ \times 7}{\frac{90-15}{22}} = \frac{105^\circ}{11}$$

$$\begin{array}{r} \text{11}^{\circ} 105' 9'' \\ \frac{99}{6 \times 60} \\ \hline \end{array} \Rightarrow \begin{array}{r} \text{11}^{\circ} 360' 32'' \\ \frac{33}{30} \\ \frac{22}{8 \times 60} \\ \hline \end{array} \Rightarrow \begin{array}{r} \text{11}^{\circ} 480'' 43'' \\ \frac{44}{40} \\ \frac{33}{7} \\ \hline \end{array} \Rightarrow 9^{\circ} 32' 43'' \text{ Ans}$$

(89)  $11^{\circ} 15'$  . रैडियन में बदलो

$$11^{\circ} \frac{15}{60}' = 11 \frac{1}{4}' = \frac{45}{4}^{\circ}$$

$$\begin{array}{l} 180^{\circ} = \pi^c \\ 1^{\circ} = \frac{\pi}{180}^c \end{array} \quad \left| \quad \frac{45}{4}^{\circ} \times \frac{\pi}{180} = \frac{\pi}{16}^c \right. \text{ Ans.}$$

(90)  $13^{\circ} 7' 30''$  . रैडियन में बदलो

$$13^{\circ} 7' \frac{30}{60}'$$

$$13^{\circ} 7\frac{1}{2}' \Rightarrow 13^{\circ} \frac{15}{2}' \Rightarrow 13^{\circ} \frac{15}{2 \times 60}^{\circ} \Rightarrow 13\frac{1}{8}^{\circ} = \frac{105}{8}^{\circ}$$

$$\Rightarrow \frac{105}{8} \times \frac{\pi}{180} = \frac{7\pi}{96}^c$$

(91)  $63^{\circ} 14' 51''$  . रैडियन में बदलो

A)  $\left(\frac{2811\pi}{8000}\right)^c$       B)  $\left(\frac{3811\pi}{8000}\right)^c$

C)  $\left(\frac{4811\pi}{8000}\right)^c$       D)  $\left(\frac{5811}{8000}\right)^c$



सारे option दूर-2 हैं  
approx. मान लेकर हो जाएगा.

$$180^{\circ} = \pi^c$$

$$1^{\circ} = \frac{\pi}{180^{\circ}}$$

$$60^{\circ} = \frac{\pi}{180^{\circ}} \times 60^{\circ} = \left(\frac{1}{3}\pi\right)^c$$

(60 के पास)

$\Rightarrow$  option A approx.  $\frac{1}{3}$  है।

$$\frac{22}{7} = \frac{4 \times 22}{22 + 4}$$

OR

$$63^\circ 14' \frac{57}{60} 17' \Rightarrow 63^\circ 14 \frac{17}{20}'$$

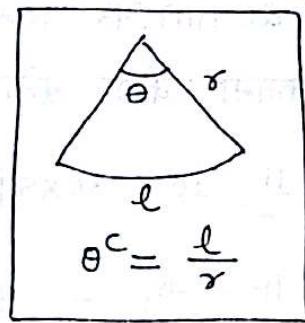
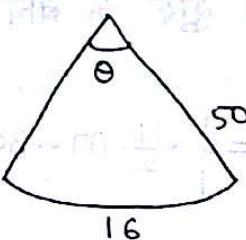
195

$$\Rightarrow 63^\circ \frac{29799}{20 \times 60}$$

$$\Rightarrow 63^\circ \frac{99}{400} \cdot \Rightarrow \frac{2811}{400} \times \frac{\pi}{\frac{180}{20}}$$

$$\Rightarrow \left( \frac{2811}{8000} \pi \right)^c \underline{\text{Ans.}}$$

- 92 50 cm लम्बाई का एक लोलक जब घुमता है तो 16 cm की चाप बनाता है। इसके द्वारा बना कोण ज्ञात करो।



$$\theta^c = \frac{l}{r} = \frac{16}{50} = \frac{8}{25}^c$$

- 93 एक पदिया 1 सेकण्ड में 3.5 बार घुमता है। कितने समय में पदिया 55^c घुमेगा

$$180^\circ = \pi^c$$

$$1 \text{ सें } 0 — \frac{\pi}{2} = \pi = 22^c$$

$$\frac{360^\circ}{\downarrow} = 360^c$$

$$22^c — 1 \text{ सें } 0$$

एक बार घुमने पर 360° का कोण बनता है

$$1^c — \frac{1}{22} \text{ सें } 0.$$

$$55^c — \frac{1}{22} \times 55 = 2.5 \text{ सें } 0.$$

- 94 किसी निश्चिह्नित के दो कोण  $\frac{1}{2}^c$  और  $\frac{1}{3}^c$  हैं। उन्हीं में तीसरा कोण ज्ञात करो।

$$\frac{1}{2} + \frac{1}{3} = \frac{5}{6}^c$$

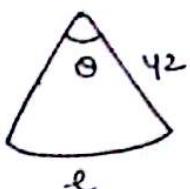
$$\frac{5}{6} \times \frac{180 \times 7}{22} = \frac{1050}{22} = 47 \frac{9}{11}^\circ$$

$$\text{तीसरा कोण} = 180^\circ - 47 \frac{9}{11}^\circ = 132 \frac{3}{11}^\circ \underline{\text{Ans}}$$

95] 42 cm किंवा वाले वृत्त की चाप ज्ञात करो जो केन्द्र पर  $15^\circ$  का कोण क्नाती है।

196]

$$15^\circ = 15 \times \frac{\pi}{180} = \frac{\pi}{12}^c = \frac{22}{7 \times 12} = \frac{11}{42}^c$$



$$\frac{11}{42}^c = \frac{l}{42}$$

$$l = 11 \text{ cm}$$

96] 5:30 AM पर मिनट की सुई और घंटे की सुई के बीच में कितना कोण बनेगा।

$$\left| \frac{11}{2} \times 20 - 30 \times 5 \right|$$

$$\text{कोण} = \left| \frac{11}{2} m - 30 H \right|$$

$$\left| 110 - 150 \right| = 40^\circ \text{ Ans.}$$

-----x x x-----

