



Identity/ formula $\Rightarrow$

$\theta = \text{any angle}$

$$\theta = 0^\circ$$

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

$$0 + 1 = 1$$

$$\theta = 30^\circ$$

$$\frac{1}{4} + \frac{3}{4} = 1$$

$$\theta = 45^\circ$$

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

$$\theta = 60^\circ$$

$$\frac{3}{4} + \frac{1}{4} = 1$$

but $\frac{0}{0}, \frac{1}{0}, \infty$,
undefine नहीं
बनना चाहिये।




$$(1 + \tan \theta + \sec \theta) \cdot (1 + \cot \theta - \operatorname{cosec} \theta) = ?$$

$\theta = \text{any angle}$

but $\theta = 45^\circ$

$$(2 + \sqrt{2}) \cdot (2 - \sqrt{2}) = 2^2 - \sqrt{2}^2 \\ = 2$$

- a) 1
- b) 2 ✓
- c) -2
- d) 3

8. $x = a + a \sin \alpha \cos \beta$, $y = b(1 + \sin \alpha \sin \beta)$, $z = c \cos \alpha$, then $\left(\frac{x-a}{a}\right)^2 + \left(\frac{y-b}{b}\right)^2 + \left(\frac{z}{c}\right)^2 = ?$

यदि $x = a + \cancel{a \sin \alpha \cos \beta}$, $y = b(1 + \cancel{\sin \alpha \sin \beta})$, $z = c \cos \alpha$, तो $\left(\frac{\cancel{a}-a}{a}\right)^2 + \left(\frac{\cancel{b}-b}{b}\right)^2 + \left(\frac{\cancel{c}}{c}\right)^2 = ?$

[A] 3

[C] -1

[B] 1 ✓

[D] 0

0 + 0 + 1

= 1

put $\alpha = \beta = 0^\circ$

$x = a$

$y = b$

$z = c$



9. If $\sin (p + q) = 1$ and $\cos (p - q) = \frac{\sqrt{3}}{2}$, find p .

यदि $\sin (p+q) = 1$ और $\cos (p-q) = \frac{\sqrt{3}}{2}$, तो p की माप ज्ञात कीजिए।

SSC CHSL 2023 PRE

[A] 120°
[C] 60°

[B] 80°
[D] 90°

$$\begin{array}{r} p+q = 90^\circ \\ + p-q = 30^\circ \\ \hline 2p = 120^\circ \\ p = 60^\circ \end{array}$$



10. If $\sin\theta + \operatorname{cosec}\theta = 2$, Then $\sin^{100}\theta + \operatorname{cosec}^{100}\theta = ?$

यदि $\sin\theta + \operatorname{cosec}\theta = 2$, तो $\sin^{100}\theta + \operatorname{cosec}^{100}\theta = ?$

[A] 0

[C] 2

[B] 1 = 1 + 1 = 2

[D] 4

$$\sin\theta + \frac{1}{\sin\theta} = 2 \Rightarrow \sin\theta = 1$$

$$\text{If, } x + \frac{1}{x} = 2 \Rightarrow x = 1$$

$$\text{If, } x + \frac{1}{x} = -2 \Rightarrow x = -1$$

11. If $\cos A + \cos B + \cos C = 3$, then what is the value of $\sin A + \sin B + \sin C$?

यदि $\cos A + \cos B + \cos C = 3$, तो $\sin A + \sin B + \sin C$ का मान क्या है?

[A] 1

[B] 2

[C] 0

[D] -1

$$\cos A + \cos B + \cos C = 3$$

$$\Rightarrow A = B = C = 0^\circ$$

$$\cos_{\max} = 1$$

12. If $\sin \alpha + \cos \beta = 2$, then $\cos \alpha + \sin \beta = ?$

यदि $\sin \alpha + \cos \beta = 2$, तो $\cos \alpha + \sin \beta = ?$

[A] 0

[C] 2

[B] 1

[D] -1

$$\alpha = 90^\circ$$

$$\beta = 0^\circ$$



13. If $16 \sec^2 \theta - 40 \sec \theta + 25 = 0$ and θ is an acute angle, then what will be the value of $\tan \theta$?

यदि $16 \sec^2 \theta - 40 \sec \theta + 25 = 0$ और θ , न्यून कोण है, तो $\tan \theta$ का मान कितना होगा?

(SSC CGL 2022)

[A] $\frac{4}{3}$
[C] $\frac{4}{5}$

[B] $\frac{3}{4}$
[D] $\frac{3}{5}$

$= \frac{3}{4}$

$$(4 \sec \theta)^2 - 2 \times 4 \sec \theta \times 5 + (5)^2 = 0$$

$$(4 \sec \theta - 5)^2 = 0$$

$$\Rightarrow 4 \sec \theta = 5$$

$$\sec \theta = \frac{5}{4} \rightarrow H$$

$$4 \rightarrow B$$

$$3 \rightarrow P$$

14. If $6 - 4\sin^2\theta = 7\sin\theta \cdot \cos\theta$ then find $\cot\theta = ?$

यदि $6 - 4\sin^2\theta = 7\sin\theta \cdot \cos\theta$ तो $\cot\theta$ ज्ञात कीजिए?

[A] $\frac{2}{3}$
[C] $\frac{1}{3}$

$\div \sin\theta$

[B] $\frac{3}{4}$
[D] $\frac{3}{2}$

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

$$6\sec^2\theta - 4 = 7\cot\theta$$

$$6 + 6\cot^2\theta - 4 = 7\cot\theta$$

$$\cot^2\theta - 7\cot\theta + 2 = 0$$

$$\cot\theta = \frac{-4}{6}, \frac{-3}{6}$$

$$= \frac{2}{3}, \frac{1}{2}$$



15. $(1 + \sin \alpha)(1 + \sin \beta)(1 + \sin \gamma) = (1 - \sin \alpha)(1 - \sin \beta)(1 - \sin \gamma)$ Then value of each side is: K (मान)

$(1 + \sin \alpha)(1 + \sin \beta)(1 + \sin \gamma) = (1 - \sin \alpha)(1 - \sin \beta)(1 - \sin \gamma)$ तो प्रत्येक पक्ष का मान है:

[A] $\pm \sin \alpha \sin \beta \sin \gamma$

[B] $\pm \sec \alpha \cdot \sec \beta \sec \gamma$

[C] $\pm \cos \alpha \cdot \cos \beta \cdot \cos \gamma$

[D] $\pm \tan \alpha \cdot \tan \beta \cdot \tan \gamma$

$$(1 + \sin 0) \cdot (1 - \sin 0) = 0^2$$

$$K \times K = \cos \alpha \cdot \cos \beta \cdot \cos \gamma$$

$$\Rightarrow K^2 = \cos \alpha \cdot \cos \beta \cdot \cos \gamma$$

$$K = \pm \cos \alpha \cdot \cos \beta \cdot \cos \gamma$$

16. $(1 + \cos \alpha)(1 - \sin \beta)(1 + \cos \gamma)(1 - \sin \delta) = (1 - \cos \alpha)(1 + \sin \beta)(1 - \cos \gamma)(1 + \sin \delta)$
 then value of each term is =?

$$\overset{K}{(1 + \cos \alpha)(1 - \sin \beta)(1 + \cos \gamma)(1 - \sin \delta)} = \overset{K}{(1 - \cos \alpha)(1 + \sin \beta)(1 - \cos \gamma)(1 + \sin \delta)} \quad \text{तो}$$

प्रत्येक पद का मान है =?

- [A] $\pm \sin \alpha \cdot \sin \beta \cdot \sin \gamma \sin \delta$
- [B] $\pm \sec \alpha \cdot \sec \beta \cdot \sec \gamma \sec \delta$
- [C] $\pm \cos \alpha \cdot \sin \beta \cdot \cos \gamma \sin \delta$
- ☒ [D] $\pm \sin \alpha \cdot \cos \beta \cdot \sin \gamma \cos \delta$

$$K \times K = \sin \alpha \cdot \cos \beta \cdot \sin \gamma \cdot \cos \delta$$

$$K = \pm \sin \alpha \cdot \cos \beta \cdot \sin \gamma \cdot \cos \delta$$

if a, b, c are in G.P. $\neq$

$$\frac{b}{a} = \frac{c}{b}$$

$$b^2 = ac$$

17. If $\cos A$, $\sin A$, $\cot A$ are in geometric progression, then the value of $\tan^6 A - \tan^2 A$ is:

अगर $\cos A$, $\sin A$, $\cot A$ गुणोत्तर श्रेणी में है, तो $\tan^6 A - \tan^2 A$ का मान क्या होगा।

[A] $\frac{1}{2}$
[C] $\frac{1}{3}$

[B] 3
[D] 1 ✓

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

$$\sin^2 A = \cos A \times \cot A$$

$$S^2 = C \times \frac{C}{S}$$

$$\frac{S^3}{C^3} = \frac{C^2}{C^3}$$

$$\Rightarrow (\tan^3 A)^2 = (\sec A)^2$$

$$\Rightarrow \tan^6 A = \sec^2 A$$



18. If $\sin\theta + \cos\theta = 1.4$, then what will be the value of $\operatorname{cosec}^2\theta + \sec^2\theta$?

यदि $\sin\theta + \cos\theta = 1.4$, है, तो $\operatorname{cosec}^2\theta \times \sec^2\theta$ का मान क्या होगा?

(SSC CGL 2022)

[A] 625/144

[C] 625/169

[B] 225/108

[D] 625/576

$$(\sin + \cos)^2 = \left(\frac{7}{5}\right)^2$$

$$1 + 2\sin\theta\cos\theta = \frac{49}{25}$$

$$2\sin\theta\cos\theta = \frac{24}{25}$$

$$\sin\theta\cos\theta = \frac{12}{25}$$

$$= (\operatorname{cosec}\theta \cdot \sec\theta)^2$$

$$= \left(\frac{25}{12}\right)^2$$

19. If $\sin x + \cos x = c$, then $\sin^6 x + \cos^6 x$ is equal to:

यदि $(\sin x + \cos x)^2 = c^2$ है, तो $\sin^6 x + \cos^6 x$ किसके बराबर है?

[A] $\frac{1+6c^2-3c^4}{16}$

[C] $\frac{1+6c^2+3c^4}{16}$

[B] $\frac{1+6c^2-3c^4}{4}$

[D] $\frac{1+6c^2+3c^4}{4}$

$= 1 - 3(S.C)^2$

$$1 + 2SC = c^2$$

$$SC = \frac{c^2 - 1}{2}$$

$= 1 - 3 \times \frac{(c^4 + 1 - 2c^2)}{4}$



20. If $\sin\theta + \sin^2\theta = 1$ then $\cos^2\theta + \cos^4\theta = ?$

यदि $\sin\theta + \sin^2\theta = 1$ है, तो $\cos^2\theta + \cos^4\theta = ?$

[A] 0

[C] -1

[B] 1 = $\cos^2\theta + \sin^2\theta = 1$

[D] 2

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

$$\Rightarrow \sin^2\theta = (\cos^2\theta)^2$$

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

21. If $\sin\theta + \sin^2\theta = 1$ then $\cos^4\theta + \cos^8\theta + 2\cos^6\theta = ?$

यदि $\sin\theta + \sin^2\theta = 1$ है, तो $(\cos^2\theta)^2 + (\cos^4\theta)^2 + 2\cos^6\theta = ?$

[A] 0

[B] 1 ✓

[C] -1

[D] 2

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

$$= 1^2 = 1$$

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

22. If $\sin \theta + \sin^2 \theta = 1$ then $\cos^{12} \theta + 3\cos^{10} \theta + 3\cos^8 \theta + \cos^6 \theta - 1 = ?$

यदि $\sin \theta + \sin^2 \theta = 1$ है, तो $(\cos^{12} \theta + 3\cos^{10} \theta + 3\cos^8 \theta + \cos^6 \theta) - 1 = ?$

[A] 0 ✓

[B] 1

[C] -1

[D] 2

$$\begin{aligned} & (\cos^4 \theta + \cos^2 \theta)^3 - 1 \\ &= 1^3 - 1 = 0 \end{aligned}$$

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

23. If $\cos A + \cos^2 A = 1$, then the value of $\sin^4 A + \sin^6 A$ is:

यदि $\cos A + \cos^2 A = 1$ है, तो $\sin^4 A + \sin^6 A$ का मान है:

(SSC CPO 2023)

[a] 2

[c] 1

[b] $\cos A$ ✓

[d] $\sin A$

$$= \cos^4 A + \cos^6 A = \cos A \cdot (\cos A + \cos^3 A) = \cos A \cdot 1$$

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

$$\cos = \sin^2$$

$$\cos^3 = (\sin^2)^3$$

24. If $\cos^2\theta + \cos^4\theta = 1$, then the value of $\sin\theta + \sin^2\theta$ is:

यदि $\cos^2\theta + \cos^4\theta = 1$ है, तो $\sin\theta + \sin^2\theta$ का मान बताइए।

[A] 0

[C] 2

[B] $\frac{1}{2} = \cos^2\theta + \sin^2\theta$

[D] 1

$$C^4 = 1 - C^2$$

$$C^4 = S^2$$

$$\Rightarrow C^2 = S$$

25. If $\cos A = \sin^2 A$, and $a \sin^{12} A + b \sin^{10} A + c \sin^8 A + \sin^6 A = 1$, then $a + b + c = ?$

यदि $\cos A = \sin^2 A$ और $a \sin^{12} A + b \sin^{10} A + c \sin^8 A + \sin^6 A = 1$ है, तो $a + b + c = ?$

[A] 7

[C] 9

[B] 8

[D] 6

= 7

$$\begin{aligned} C^2 &= S^4 \\ \downarrow \\ 1 - S^2 &= S^4 \end{aligned}$$

$$\Rightarrow (S^4 + S^2)^3 = 1^3$$

$$1 \cdot S^{12} + S^6 + 3S^{10} + 3S^8 = 1$$