

Misc.
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99. $\frac{(1+\sec\theta\csc\theta)^2(\sec\theta-\tan\theta)^2(1+\sin\theta)}{(\sin\theta+\sec\theta)^2+(\cos\theta+\csc\theta)^2}$, $0^\circ < \theta < 90^\circ$, is equal to:

~~$\frac{(1+\sec\theta\csc\theta)^2(\sec\theta-\tan\theta)^2(1+\sin\theta)}{(\sin\theta+\sec\theta)^2+(\cos\theta+\csc\theta)^2}$~~ $\stackrel{?}{=} ?$, $0^\circ < \theta < 90^\circ$ बराबर है:

[A] $1 - \cos\theta$

[B] $1 - \sin\theta$

[C] $\cos\theta$

[D] $\sin\theta$

$$\frac{(\sec\theta - \tan\theta)^2 \times (\sec\theta + \tan\theta)}{\sec\theta} = 1 - \sin\theta$$

$$\frac{S}{C \cdot \sec\theta}$$

$$(\sin\theta + \sec\theta)^2 + (\sec\theta + \tan\theta)^2 = 1 + \sec^2\theta + \tan^2\theta + 2\tan\theta + 2\sec\theta$$

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

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

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

2 sinθ · secθ

$$= 2 \csc\theta$$

2 secθ · tanθ

100. Simplify $\left(\frac{1}{\tan\theta} + \frac{1}{\cot\theta}\right) (\operatorname{cosec}\theta - \cot\theta) \left(\frac{1+\cos\theta}{\cos\theta}\right)$?

$\left(\frac{1}{\tan\theta} + \frac{1}{\cot\theta}\right) (\operatorname{cosec}\theta - \cot\theta) \left(\frac{1+\cos\theta}{\cos\theta}\right)$ को सरल बनाएं?

(CHSL PRE 2021) $\frac{1}{S} - \frac{C}{S}$

[A] $1 - \sec^2\theta$

[B] $1 + \sec^2\theta$

[C] $1 - \tan^2\theta$

[D] $1 + \tan^2\theta$

$\frac{1}{\cancel{S}C} \times \left(\frac{1-\cancel{C}}{\cancel{S}}\right) \times \left(\frac{1+\cancel{C}}{C}\right)$

$= \frac{1}{C^2} = \sec^2\theta$

101. The expression $\frac{\tan^6 \theta - \sec^6 \theta + 3 \sec^2 \theta \tan^2 \theta}{\tan^2 \theta + \cot^2 \theta + 2}$, $0^\circ < \theta < 90^\circ$, is equal to:

व्यंजक $\frac{\tan^6 \theta - \sec^6 \theta + 3 \sec^2 \theta \tan^2 \theta}{\tan^2 \theta + \cot^2 \theta + 2}$ का मान बताइए जहां $0^\circ < \theta < 90^\circ$ है।

[A] ~~$\sec^2 \theta \operatorname{cosec}^2 \theta$~~

[C] ~~$\cos^2 \theta \sin^2 \theta$~~

[B] ~~$-\sec^2 \theta \operatorname{cosec}^2 \theta$~~

[D] ~~$-\cos^2 \theta \sin^2 \theta$~~

put $\theta = 45^\circ$

$$\frac{1 - 8 + 6}{4}$$

$$= -\frac{1}{4}$$

$$= -\frac{1}{2} \times \frac{1}{2} = -\frac{1}{4}$$

102. The expression $\frac{\cos^4\theta - \sin^4\theta + 2\sin^2\theta + 3}{(\operatorname{cosec}\theta + \cot\theta + 1)(\operatorname{cosec}\theta - \cot\theta + 1) - 2}$, $0^\circ < \theta < 90^\circ$, is equal to

व्यंजक $\frac{\cos^4\theta - \sin^4\theta + 2\sin^2\theta + 3}{(\operatorname{cosec}\theta + \cot\theta + 1)(\operatorname{cosec}\theta - \cot\theta + 1) - 2}$, का मान बताइए, जहां $0^\circ < \theta < 90^\circ$ है।

[A] ~~$\frac{1}{2}\sin\theta$~~

[C] ~~$\sec\theta$~~

[B] $2\sin\theta = 2 \times 1$

[D] ~~$2\operatorname{cosec}\theta$~~

put $\theta = 45^\circ$

$$\frac{4}{(\sqrt{2} + 1) \cdot \sqrt{2} - 2}$$

$$= \frac{4}{\cancel{2} + \cancel{2}\sqrt{2} - 2} = \sqrt{2}$$

put $\theta = 90^\circ$

$$\frac{-1 + 2 + 3}{2 \times 2 - 2}$$

$$= \frac{4}{2} = 2$$

103. The expression $\frac{(1-\sin\theta+\cos\theta)^2(1-\cos\theta)\sec^3\theta\operatorname{cosec}^2\theta}{(\sec\theta-\tan\theta)(\tan\theta+\cot\theta)}$, $0^\circ < \theta < 90^\circ$, is equal to

व्यंजक $\frac{(1-\sin\theta+\cos\theta)^2(1-\cos\theta)\sec^3\theta\operatorname{cosec}^2\theta}{(\sec\theta-\tan\theta)(\tan\theta+\cot\theta)}$, का मान बताइए, जहां $0^\circ < \theta < 90^\circ$ है।

[A] ~~$\sin\theta$~~

[B] ~~$2\cos\theta$~~

[C] $\cot\theta$

[D] $2\tan\theta$

Let $\theta = 45^\circ$

$$\frac{1 \times \frac{\sqrt{2}-1}{\sqrt{2}} \times \frac{2\sqrt{2}}{\sqrt{2}} \times 2}{(\sqrt{2}-1) \times 2} = 2$$

104. **Simplify:** $\frac{(\operatorname{cosec}\theta - 1 + \cot\theta)^2}{2\operatorname{cosec}^2\theta} = ?$

सरलीकरण कीजिए: $\frac{(\operatorname{cosec}\theta - 1 + \cot\theta)^2}{2\operatorname{cosec}^2\theta} = ?$

[A] $(1 + \cos\theta)(1 - \sin\theta)$

[B] $(1 - \cos\theta)(1 - \sin\theta)$

[C] $(1 - \cos\theta)(1 + \sin\theta)$

[D] $(1 + \cos\theta)(1 + \sin\theta)$

H.W

$$\sec \phi = \frac{p^2 + q^2}{2pq}$$

(GIL MAINS
20/8)

105. If $\frac{1+\sin\theta}{1-\sin\theta} = \frac{p^2}{q^2}$, then $\sec\theta$ is equal to:

यदि $\frac{1+\sin\theta}{1-\sin\theta} = \frac{p^2}{q^2}$, तो $\sec\theta$ बराबर है:

[A] ~~$\frac{p^2 q^2}{p^2 + q^2}$~~

[C] ~~$\frac{2p^2 q^2}{p^2 + q^2}$~~

[B] $\frac{1}{2} \left(\frac{q}{p} + \frac{p}{q} \right)$

[D] ~~$\frac{1}{p^2} + \frac{1}{q^2}$~~

$$\Rightarrow \frac{1}{\sin\theta} = \frac{p^2 + q^2}{p^2 - q^2}$$

$$\Rightarrow \sec\theta = \frac{p^2 + q^2}{p^2 - q^2}$$

H ←
p ←

106. If θ is an acute angle, find the denominator D, when $(\cot \theta - \operatorname{cosec} \theta)^2 = \frac{1 - \cos \theta}{D}$?

यदि θ एक न्यून कोण है, तो हर D ज्ञात कीजिए, जब $(\cot \theta - \operatorname{cosec} \theta)^2 = \frac{1 - \cos \theta}{D}$?

RRB ALP 2024

[A] $1 + \sin \theta$

[C] $-1 - \cos \theta$

[B] $-\sin \theta - 1$

[D] $1 + \cos \theta$

$$\frac{\frac{C}{S} - \frac{1}{S}}{\left(\frac{C-1}{S}\right)^2}$$

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

$$(C-1)^2 = (1-C)^2$$

107. If $\tan A + \cot A = 4$ and $\tan A \cot A = 1$, find $\tan^2 A + \sec^2 A$.

यदि $\tan A + \cot A = 4$ तथा $\tan A \cot A = 1$ हो, तो $\tan^2 A + \sec^2 A$ ज्ञात कीजिए।

SSC CGL 2025 PRE

[A] $14 + 8\sqrt{3}$

[B] $15 + 8\sqrt{3}$

[C] $16 + 6\sqrt{2}$

[D] $13 + 4\sqrt{3}$

$$T^2 + T^2 + 1 = 2T^2 + 1$$

$$= 2 \cdot (2 + \sqrt{3})^2 + 1$$

$$= 2 \times (7 + 4\sqrt{3}) + 1$$

$$\tan A + \frac{1}{\tan A} = (2 + \sqrt{3}) + (2 - \sqrt{3})$$

$$x - 2 = \sqrt{3}$$
$$x = 2 + \sqrt{3}$$

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

$$x^2 - 4x + 4 = 3$$

$$(x - 2)^2 = 3$$

$$\sqrt{3}$$

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

108. If $2 \tan A = 3$, then the value of $(\sec A + \tan A - 1)(\sec A - \tan A + 1)$ is:

यदि $2 \tan A = 3$ है, तो $(\sec A + \tan A - 1)(\sec A - \tan A + 1)$ का मान ज्ञात कीजिए।

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[A] 3

[C] 2

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

[D] $2\frac{1}{3}$

$$(\sec A + \frac{3}{2}) \times (\sec A - \frac{3}{2})$$

$$= \sec^2 A - \frac{1}{4}$$

$$= \frac{13}{4} - \frac{1}{4} = 3$$

$$\tan A = \frac{3}{2}$$

$$\sec^2 A = 1 + \left(\frac{3}{2}\right)^2 = \frac{13}{4}$$

109. If $5 + 12\tan\theta = \sec\theta$ & $12 - 5\tan\theta = k\sec\theta$, then find k^2 ?

यदि $5 + 12\tan\theta = \sec\theta$ & $12 - 5\tan\theta = k\sec\theta$ है, तो k^2 ज्ञात कीजिये?

[A] 101

[C] 168

[B] 27

[D] 99

(CDS 2023)

$$5\sec\theta + 12\tan\theta = 1$$

$$12\sec\theta - 5\tan\theta = k$$

$$5^2 + 12^2 = 1^2 + k^2$$

$$169 - 1 = k^2$$

110. If $a^2 \operatorname{cosec}^2 \theta - b^2 \cot^2 \theta = 7$ and $a \operatorname{cosec} \theta + b \cot \theta = 1$, then $a^2(b^2 + 9) = ?$

[A] $14b^2$

~~[B] $16b^2$~~

[C] $25b^2$

[D] $10b^2$

$$a \operatorname{cosec} \theta + b \cot \theta = 1$$

$$a \operatorname{cosec} \theta - b \cot \theta = 7$$

$$\frac{2a \operatorname{cosec} \theta = 8}{2b \cot \theta = -6}$$

$$\operatorname{cosec} \theta = \frac{4}{a}$$

$$\cot \theta = -\frac{3}{b}$$

$$(a \operatorname{cosec} \theta)^2 - (b \cot \theta)^2 = 7$$

$$1 \times (a \operatorname{cosec} \theta - b \cot \theta) = 7$$

① जाका बरन है

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

$$\frac{16}{a^2} - \frac{9}{b^2} = 1$$

$$16b^2 - 9a^2 = a^2 b^2$$

$$16b^2 = a^2 b^2 + 9a^2$$

111. Let $12(\tan\theta + \cot\theta) = 25$, where $45^\circ < \theta < 90^\circ$.

What is a value of $(\sin\theta - \cos\theta)$?

$\sin\theta - \cos\theta$ का मान क्या है?

[A]

~~$-\frac{1}{5}$~~

[C]

$\frac{1}{5}$

[B]

~~$-\frac{2}{5}$~~

[D]

$\frac{2}{5}$

$\sin\theta > \cos\theta$

$$\tan\theta + \cot\theta = \frac{25}{12}$$
$$\frac{4}{3} + \frac{3}{4}$$

$$\frac{4-3}{11} = \frac{1}{5}$$

$$\begin{array}{ccc} \frac{1}{\sqrt{2}} & \frac{\sqrt{3}}{2} & 1 \\ \frac{1}{\sqrt{2}} & \frac{1}{2} & 0 \end{array}$$



and



