

#

यदि,

$$\underset{\substack{\downarrow \\ p}}{a} \sin \theta + \underset{\substack{\downarrow \\ B}}{b} \cos \theta = \underset{\substack{\downarrow \\ H}}{c}$$

✗

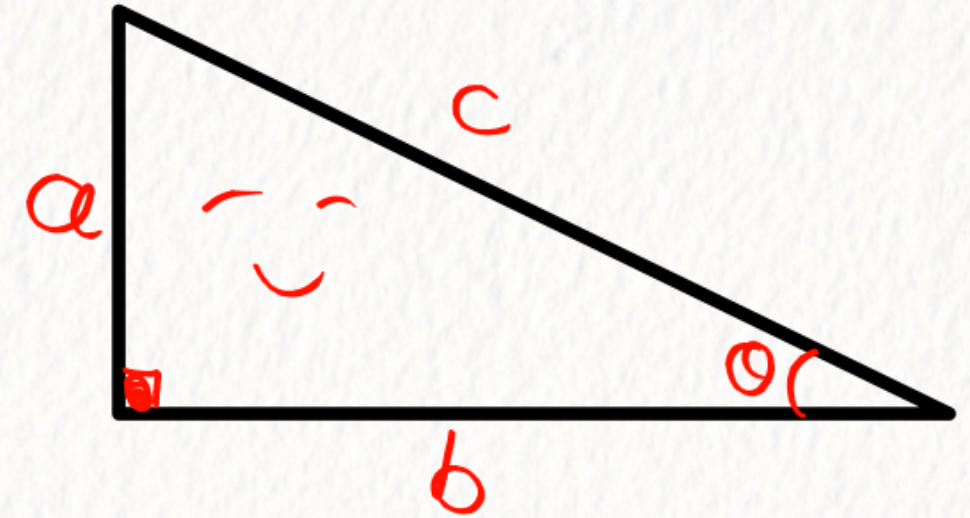
$$a^2 + b^2 = c^2$$

$$\Rightarrow \frac{a}{c} \sin \theta + \frac{b}{c} \cos \theta = 1$$

$$p^2 + B^2 = H^2$$

Compare
कैसे पर

$$\sin \theta \cdot \sin \theta + \cos \theta \cdot \cos \theta = 1$$



$$\sin \theta = \frac{a}{c} \rightarrow \begin{matrix} p \\ H \end{matrix}$$

$$\cos \theta = \frac{b}{c} \rightarrow \begin{matrix} B \\ H \end{matrix}$$

यदि $\underset{P}{15} \sin \theta + \underset{B}{8} \cos \theta = \underset{H}{17} \Rightarrow 15^2 + 8^2 = 17^2$

तो $\cos \theta = \frac{8}{15}$

43. If $3 \sin A + 4 \cos A = 5$, the the value of $\tan A$ is:

यदि $3 \sin A + 4 \cos A = 5$ है, तो $\tan A$ का मान ज्ञात कीजिए।

[A] $3/4$

[C] $5/4$

[B] $3/5$

[D] $4/5$

$\frac{3}{4}$

44. If $11\sin\theta + 60\cos\theta = 61$; $0 < \theta < 90^\circ$, then what is the value of $\sqrt{660(\tan\theta + \cot\theta)}$?

यदि $11\sin\theta + 60\cos\theta = 61$ $0 < \theta < 90^\circ$, तो $\sqrt{660(\tan\theta + \cot\theta)}$ का मान क्या है?

[A] 61

[B] $61\sqrt{2}$

[C] 122

[D] $122\sqrt{2}$

$$11^2 + 60^2 = 61^2$$

$$= \sqrt{660 \left(\frac{11}{60} + \frac{60}{11} \right)}$$

$$= \sqrt{11^2 + 60^2} = 61$$

45. $24\sin\theta + 7\cos\theta = 25$, then $7\sin\theta + 24\cos\theta = ?$

$\overset{P}{24}\sin\theta + \overset{B}{7}\cos\theta = \overset{H}{25}$, तो $7\sin\theta + 24\cos\theta = ?$

[A] 25

[C] $317/24$

✓ [B] $336/25$

[D] $275/7$

$$= 7 \times \frac{24}{25} + 24 \times \frac{7}{25}$$

$$= \frac{336}{25}$$

46. $(a^2 - b^2)\sin \theta + 2ab \cos \theta = a^2 + b^2$, then $\tan \theta = ?$

$(a^2 - b^2)\sin \theta + 2ab \cos \theta = a^2 + b^2$, तब $\tan \theta = ?$

☒ [A] $\frac{a^2 - b^2}{2ab}$

[B] $\frac{2ab}{a^2 - b^2}$

[C] $\frac{a^2 - b^2}{a^2 + b^2}$

[D] $\frac{a^2 + b^2}{a^2 - b^2}$

[CGL 2014, 15, 16]

47. If $24\sin^4\alpha + 40\cos^4\alpha = 15$, Then $54\tan^6\alpha + 125\operatorname{cosec}^6\alpha = ?$

यदि $24\sin^4\alpha + 40\cos^4\alpha = 15$, तो $54(\tan^2\alpha)^3 + 125(\operatorname{cosec}^2\alpha)^3 = ?$

[A] 729

[B] 762

[C] 716

[D] 625

$$= \cancel{54 \times \frac{125}{27}} + \cancel{125 \times \frac{5}{125}} = 762$$

$$\left(\frac{8}{5}\sin^2\alpha\right) \cdot \sin^2\alpha + \left(\frac{8}{3}\cos^2\alpha\right) \cdot \cos^2\alpha = 1$$

$$\sin^2\alpha = \frac{5}{8}$$

$$\cos^2\alpha = \frac{3}{8}$$

$$\tan^2\alpha = \frac{5}{3} \quad \& \quad \operatorname{cosec}^2\alpha = \frac{8}{5}$$

compare

$$\textcircled{1}\sin^2\alpha + \textcircled{1}\cos^2\alpha = 1$$

$$\frac{8}{5}\sin^2\alpha = 1$$

$$= \frac{a}{(a+b)^4} + \frac{b}{(a+b)^4}$$

$$= \frac{(a+b)}{(a+b)^4}$$

$$\left(\frac{a+b}{a} \sin^2 A \right) \sin^2 A + \left(\frac{a+b}{b} \cos^2 A \right) \cos^2 A = 1$$

$$\sin^2 A = \frac{a}{a+b}$$

$$\cos^2 A = \frac{b}{a+b}$$

48. If $\frac{\sin^4 A}{a} + \frac{\cos^4 A}{b} = \frac{1}{a+b}$, then $\frac{\sin^8 A}{a^3} + \frac{\cos^8 A}{b^3} = ?$

यदि $\frac{\sin^4 A}{a} + \frac{\cos^4 A}{b} = \frac{1}{a+b}$ है, तो $\frac{(\sin^2 A)^4}{a^3} + \frac{(\cos^2 A)^4}{b^3} = ?$

[A] $\frac{1}{(a+b)^2}$

[B] $\frac{a^2 b^2}{(a+b)^2}$

[C] $\frac{1}{(a+b)^3}$

[D] $\frac{a^3 b^3}{(a+b)^2}$

Misc $\Rightarrow$

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

$$(\sin\theta - \cos\theta)^2 = 1 - 2\sin\theta.\cos\theta \quad \checkmark$$

$$(\tan\theta + \cot\theta)^2 = \tan^2\theta + \cot^2\theta + 2 = \sec^2\theta + \operatorname{cosec}^2\theta = \sec^2\theta.\operatorname{cosec}^2\theta$$

$$\tan\theta + \cot\theta = \frac{1}{\sin\theta.\cos\theta} = \text{zero} \cdot \text{zero}$$



49. Simplify the expression: $\sin^2 x + \cos^2 x + \tan^2 x$.

अभिव्यक्ति को सरल करें: $\sin^2 x + \cos^2 x + \tan^2 x$.

[A] 1

[B] $\cot^2 x$

[C] $\sec^2 x$ ✓

[D] 2

50. Which of the following is NOT a correct formula?

निम्नलिखित में से कौन सा सही सूत्र नहीं है?

(SSC SELECTION POST XII HIGHER SECONDARY LEVEL)

~~[A]~~ $\frac{1+\tan^2 A}{\tan^2 A} = \sin^2 A$

~~[B]~~ $\sec A \sin A = \tan A$

~~[C]~~ $\operatorname{cosec}^2 A - \cot^2 A = 1$

~~[D]~~ $\cos^2 A \cot^2 A = \cot^2 A - \cos^2 A$

$\cot^2 A + 1 = \operatorname{cosec}^2 A$

51. $(1 - \sin A \cdot \cos A)(\sin A + \cos A) = ?$

[A] $\sin^2 A - \cos^2 A$

☒ [B] $\sin^3 A + \cos^3 A$

[C] $\cos^2 A - \sin^2 A$

[D] 0

$$(s^2 + c^2 - sc)(s + c) = s^3 + c^3$$

52. What is the value of $\sin A \left(1 + \frac{\sin A}{\cos A}\right) + \cos A \left(1 + \frac{\cos A}{\sin A}\right)$?

$\sin A \left(1 + \frac{\sin A}{\cos A}\right) + \cos A \left(1 + \frac{\cos A}{\sin A}\right)$ का मान क्या है?

☒ [A] $\sec A + \operatorname{cosec} A$

☒ [B] $\sin A + \cos A$

☒ [C] $\sin A + \cos A$

☒ [D] $\sec A + \operatorname{cosec} A$

$$\begin{aligned} & S \cdot \left(\frac{C+S}{C} \right) + C \left(\frac{S+C}{S} \right) = \frac{C+S}{C \cdot S} \\ & = (C+S) \times \left(\frac{S}{C} + \frac{C}{S} \right) \end{aligned}$$

53. $\left(\frac{\operatorname{cosec} A}{\cot A + \tan A} \right)^2 = ?$

[A] $2\cos^2 A$

[C] $\sec^2 A$

~~[B]~~ $1 - \sin^2 A$

[D] $\sec A \cdot \tan A$

$$\left(\frac{\cancel{\operatorname{cosec} A}}{\cancel{\sec A} \cdot \cancel{\operatorname{cosec} A}} \right)^2 = c^2$$

54. The value of $1 + \sqrt{\frac{\cot\theta + \cos\theta}{\cot\theta - \cos\theta}}$, if $0^\circ < \theta < 90^\circ$, is equal to:

यदि $0^\circ < \theta < 90^\circ$ है, तो $1 + \sqrt{\frac{\cot\theta \oplus \cos\theta}{\cot\theta - \cos\theta}}$ का मान ज्ञात कीजिए।

[A] ~~$1 - \sec\theta + \tan\theta$~~

[B] ~~$1 - \sec\theta - \tan\theta$~~

[C] ~~$1 + \sec\theta - \tan\theta$~~

[D] $1 + \sec\theta + \tan\theta$

$$\sqrt{\frac{\cancel{\cot\theta} + \cancel{c}}{\cancel{\cot\theta} - \cancel{c}}}$$

$$1 + \sec\theta + \tan\theta$$

$$= \sqrt{\frac{1+S}{1-S}} = \sqrt{\frac{1+S}{1-S} \times \frac{1+S}{1+S}} = \frac{1+S}{C} =$$

55. $\frac{\cos\theta}{\sec\theta-1} + \frac{\cos\theta}{\sec\theta+1}$ is equal to:-

$\frac{\cos\theta}{\sec\theta-1} + \frac{\cos\theta}{\sec\theta+1}$ का मान _____ के बराबर है?

SSC CHSL 2023 PRE

~~[A] $2\sin^2\theta$~~

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

☒ [C] $2\cot^2\theta$

[D] $2\cos^2\theta$

$$\cancel{C \times \frac{2\sec\theta}{T^2}} \\ = 2\cot^2\theta$$

56. The value of $\frac{\tan^2 \theta - \sin^2 \theta}{2 + \tan^2 \theta + \cot^2 \theta}$ is:-

$\frac{\tan^2 \theta - \sin^2 \theta}{2 + \tan^2 \theta + \cot^2 \theta}$ का मान क्या है?

[A] $\operatorname{cosec}^6 \theta$

[B] $\cos^4 \theta$

[C] $\sin^6 \theta$

[D] $\sec^4 \theta$

$$(\tan + \cot)^2$$

$$\frac{\tan^2 \times \sin^2}{(\sec^2)^2}$$

~~$\sec^2 \times \sec^2 \times \sec^2$~~

$= \sin^2$

56. The value of $\frac{\tan^2 \theta - \sin^2 \theta}{2 + \tan^2 \theta + \cot^2 \theta}$ is:-

$$\frac{\tan^2 \theta - \sin^2 \theta}{2 + \tan^2 \theta + \cot^2 \theta}$$

का मान क्या है?

[A] ~~$\operatorname{cosec}^6 \theta$~~

[C] $\sin^6 \theta$ ✓

[B] ~~$\cos^4 \theta$~~

[D] ~~$\sec^4 \theta$~~

$\theta = \text{any angle}$

but $\theta = 45^\circ$

$$\frac{1 - \frac{1}{2}}{4} = \frac{1}{8}$$

$$\left(\frac{1}{\sqrt{2}}\right)^4$$

57. The value of $\sin 2\theta (\tan \theta + \cot \theta)$ is:-
 $\sin 2\theta (\tan \theta + \cot \theta)$ का मान क्या होगा?

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

[B] 1

[D] 2

~~$2 \sin \theta \times \frac{1}{\sin \theta}$~~

58.

$$\sqrt{\frac{\operatorname{cosec} A}{\operatorname{cosec} A - 1} + \frac{\operatorname{cosec} A}{\operatorname{cosec} A + 1}} = 2, \text{ then } A = ?$$

[A] $\frac{\pi}{2}$

[B] $\frac{\pi}{3}$

[C] $\frac{\pi}{4}$

[D] $\frac{\pi}{6}$

~~1/2~~

$$\sqrt{\frac{\operatorname{cosec} A \times \operatorname{cosec} A}{\operatorname{cosec}^2 A}} = 2$$

$$\operatorname{cosec} A = \sqrt{2}$$

$$\Rightarrow A = 45^\circ$$

$$\sqrt{2} \times \frac{\operatorname{cosec} A}{\operatorname{cosec} A} = 2$$

59. Solve $\frac{(1-\sin\theta+\cos\theta)^2}{2}$:

$\frac{(1-\sin\theta+\cos\theta)^2}{2}$ को हल करें:

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

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

✓ [B] $(1+\cos\theta)(1-\sin\theta)$

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

$$\frac{(1-s)^2 + c^2 + 2(1-s)c}{2}$$

$$= (1-s) \frac{1-s+1+s+2c}{2}$$

$$= (1-s)(1+c)$$

$$c^2 = (1-s)(1+s)$$

60. The value of $\frac{\cos^6 \theta + \sin^6 \theta + 3 \sin^2 \theta \cos^2 \theta}{\operatorname{cosec} \theta \sec \theta (\sin \theta + \cos \theta - 1)(\sin \theta + \cos \theta + 1)}$ is:

$\frac{\cos^6 \theta + \sin^6 \theta + 3 \sin^2 \theta \cos^2 \theta}{\operatorname{cosec} \theta \sec \theta (\sin \theta + \cos \theta - 1)(\sin \theta + \cos \theta + 1)}$ का मान ज्ञात कीजिए।

[A] 1

[B] 2

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

[D] 3

$$(\cos^2 + \sin^2)^3 = 1$$

$$\frac{\cancel{\cos^6 \theta} \cdot \cancel{\sin^6 \theta} \times \cancel{3 \sin^2 \theta \cos^2 \theta}}{\cancel{\operatorname{cosec} \theta} \cdot \cancel{\sec \theta} \times \cancel{2 \sin \theta \cos \theta}} = \frac{1}{2}$$

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

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

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

[A] $\cos^2\theta$

[B] $-\sin^2\theta$

[C] $\sec^2\theta$

[D] $-\sec^2\theta$

$$\frac{\frac{1+1}{1}}{(1+1)} \times C \times S$$

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

62. If $t = \cos 79^\circ$, then what is $\operatorname{cosec} 79^\circ (1 - \cos 79^\circ)$ equal to?

यदि $t = \cos 79^\circ$, तो $\operatorname{cosec} 79^\circ (1 - \cos 79^\circ)$ किसके बराबर है?

(CDS-1 2024)

[A] $\sqrt{\frac{1+t}{1-t}}$

[B] $\frac{t}{\sqrt{1-t^2}}$

[C] $\frac{\sqrt{1-t^2}}{t}$

[D] $\sqrt{\frac{1-t}{1+t}}$

$$S = \sqrt{1 - C^2}$$

$$\begin{aligned} & \frac{1-C}{S} \\ &= \frac{\cancel{1-C}}{\sqrt{\cancel{(1-C)}(1+C)}} = \sqrt{\frac{1-C}{1+C}} \end{aligned}$$

63. What is the value of $\frac{1}{\sin^4(90-2\alpha)} + \frac{1}{\cos^2(90-2\alpha)-1}$?

$\frac{1}{\sin^4(90-2\alpha)} + \frac{1}{\cos^2(90-2\alpha)-1}$ का मान क्या है?

SSC CHSL PRE 2024

[A] $\sin^2 2\alpha + \tan^2 2\alpha$

[B] $\sec^2 2\alpha \tan^2 2\alpha$

[C] $\sec^2 2\alpha + \cot^2 2\alpha$

[D] $\cos^2 2\alpha \cot^2 2\alpha$

$$1 - S^2 = C^2$$

$$\frac{1}{C^4} - \frac{1}{C^2}$$

$$= \sec^4 2\alpha - \sec^2 2\alpha$$

$$= \sec^2 2\alpha \cdot \tan^2 2\alpha$$

64. The value of $\frac{\sec\theta(1-\sin\theta)(\sin\theta+\cos\theta)(\sec\theta+\tan\theta)}{\sin\theta(1+\tan\theta)+\cos\theta(1+\cot\theta)}$ is equal to

~~$\frac{\sec\theta(1-\sin\theta)(\sin\theta+\cos\theta)(\sec\theta+\tan\theta)}{\sin\theta(1+\tan\theta)+\cos\theta(1+\cot\theta)}$~~ का मान बराबर है:

[A] cosec θ sec θ

[B] sin θ cos θ

[C] 2cos θ

[D] 2sin θ

$$\frac{\cancel{(S+C)}}{S \cdot \left(\frac{C+S}{C}\right) + C \cdot \left(\frac{S+C}{S}\right)}$$

$$= \frac{1}{\cancel{\frac{S}{C} + \frac{C}{S}}} = \frac{1}{\cancel{(S+C)}} = SC$$

$$(\sec\phi + \tan\phi) \cdot (\sec\phi - \tan\phi) = 1$$

65. $\sin^4\theta + \cos^4\theta$ in terms of $\sin\theta$ can be written as:

$\sin^4\theta + \cos^4\theta$ को $\sin\theta$ के रूप में लिखा जा सकता है:

[a] $2\sin^4\theta + 2\sin^2\theta - 1$

[b] $2\sin^4\theta - 2\sin^2\theta$

[c] $2\sin^4\theta - 2\sin^2\theta - 1$

[d] $2\sin^4\theta - 2\sin^2\theta + 1$

$\rightarrow = 1 - 2\sin^2(1 - \sin^2)$
 $= 1 - 2\sin^2 + 2\sin^4$

66. If $l \cos^2 \theta + m \sin^2 \theta = \frac{\cos^2 \theta (\operatorname{cosec}^2 \theta + 1)}{\operatorname{cosec}^2 \theta - 1}$, (where $0^\circ < \theta < 90^\circ$), then find the value of $\tan \theta$?

यदि $l \cos^2 \theta + m \sin^2 \theta = \frac{\cos^2 \theta (\operatorname{cosec}^2 \theta + 1)}{\operatorname{cosec}^2 \theta - 1}$, (where $0^\circ < \theta < 90^\circ$) है, तो $\tan \theta$ का मान ज्ञात कीजिये?

[RRB Group D - 2022]

[a] $\sqrt{\frac{l-2}{l-m}}$

[b] $\sqrt{\frac{2-l}{l-m}}$

[c] $\sqrt{\frac{l-2}{m-1}}$

✓ [d] $\sqrt{\frac{l-1}{2-m}}$

~~$\frac{1+S^2}{1-S^2}$~~

÷ ७९०

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

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

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