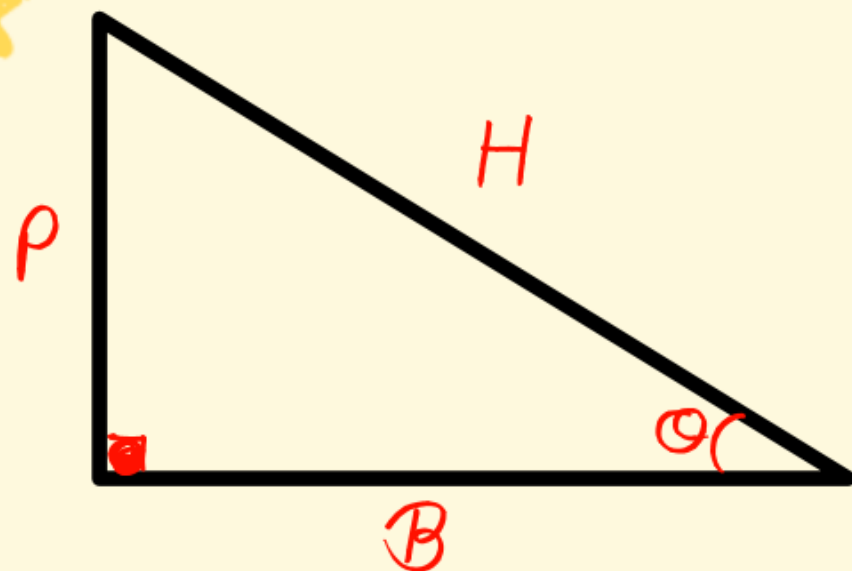




$$\div H^2$$

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

$$\left(\frac{p}{H}\right)^2 + \left(\frac{B}{H}\right)^2 = 1$$

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

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

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

$$\frac{\sin \theta}{1 + \cos \theta} \rightarrow \frac{1 - \cos \theta}{\sin \theta}$$


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

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

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


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

$$\underline{\sin^4\theta + \cos^4\theta + 2\sin^2\theta \cdot \cos^2\theta = 1}$$

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


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

$$(a^m)^n = a^{m \times n}$$

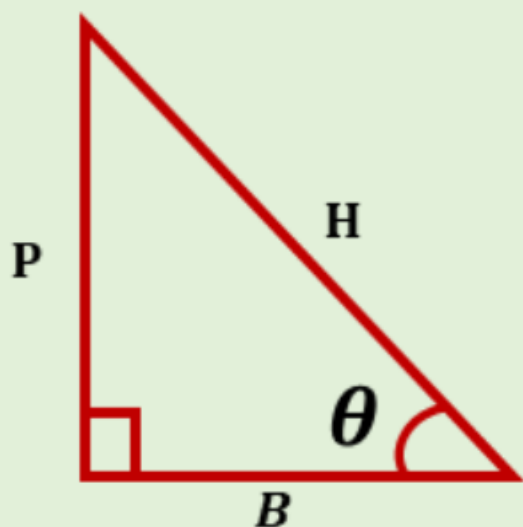

$$(\sin^2\theta + \cos^2\theta)^3 = 1^3$$

$$\underline{\sin^6\theta + \cos^6\theta} + 3\sin^2\theta \cdot \cos^2\theta = 1$$

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

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

Basic Trigonometric Identities ✓



$$H^2 = P^2 + B^2$$

$$\left(\frac{P}{H}\right)^2 + \left(\frac{B}{H}\right)^2 = 1$$



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

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

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

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

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

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

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

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

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

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

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

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

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

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



$$B^2 + P^2 = H^2$$

$$\div B^2$$

$$1 + \left(\frac{P}{B}\right)^2 = \left(\frac{H}{B}\right)^2$$

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

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

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

$$\frac{\tan \theta}{\sec \theta - 1} \rightarrow \frac{\sec \theta + 1}{\tan \theta}$$



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

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

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

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

if, $\sec \theta + \tan \theta = \frac{7}{3}$
 $\sec \theta - \tan \theta = \frac{3}{7}$
 $\tan \theta - \sec \theta = -\frac{3}{7}$




$$(\sec^2\theta - \tan^2\theta)^3 = 1^3$$

$$\sec^6\theta - \tan^6\theta - 3\sec^2\theta \cdot \tan^2\theta = 1$$

$$\sec^6\theta - \tan^6\theta = 1 + 3\sec^2\theta \cdot \tan^2\theta$$

$$(a-b)^3 = a^3 - b^3 - 3ab(a-b)$$



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

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

$\cos^2 \theta$ से भाग देने पर

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

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

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

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

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

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

$$p^2 + b^2 = H^2$$

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

#

$$\div p^2 \quad 1 + \left(\frac{b}{p}\right)^2 = \left(\frac{H}{p}\right)^2 \Rightarrow 1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$$

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

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

$$\frac{\cot \theta}{(\operatorname{cosec} \theta + 1)} = \frac{(\operatorname{cosec} \theta - 1)}{\cot \theta}$$

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

$$(\operatorname{cosec} \theta + \cot \theta)(\operatorname{cosec} \theta - \cot \theta) = 1$$

$$(\operatorname{cosec} \theta + \cot \theta) = \frac{1}{(\operatorname{cosec} \theta - \cot \theta)}$$



$$\sec^2\theta + \operatorname{cosec}^2\theta \longrightarrow \frac{1}{\cos^2\theta} + \frac{1}{\sin^2\theta} \longrightarrow \frac{\sin^2\theta + \cos^2\theta}{\sin^2\theta \cos^2\theta} \longrightarrow \frac{1}{\sin^2\theta \cos^2\theta}$$

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

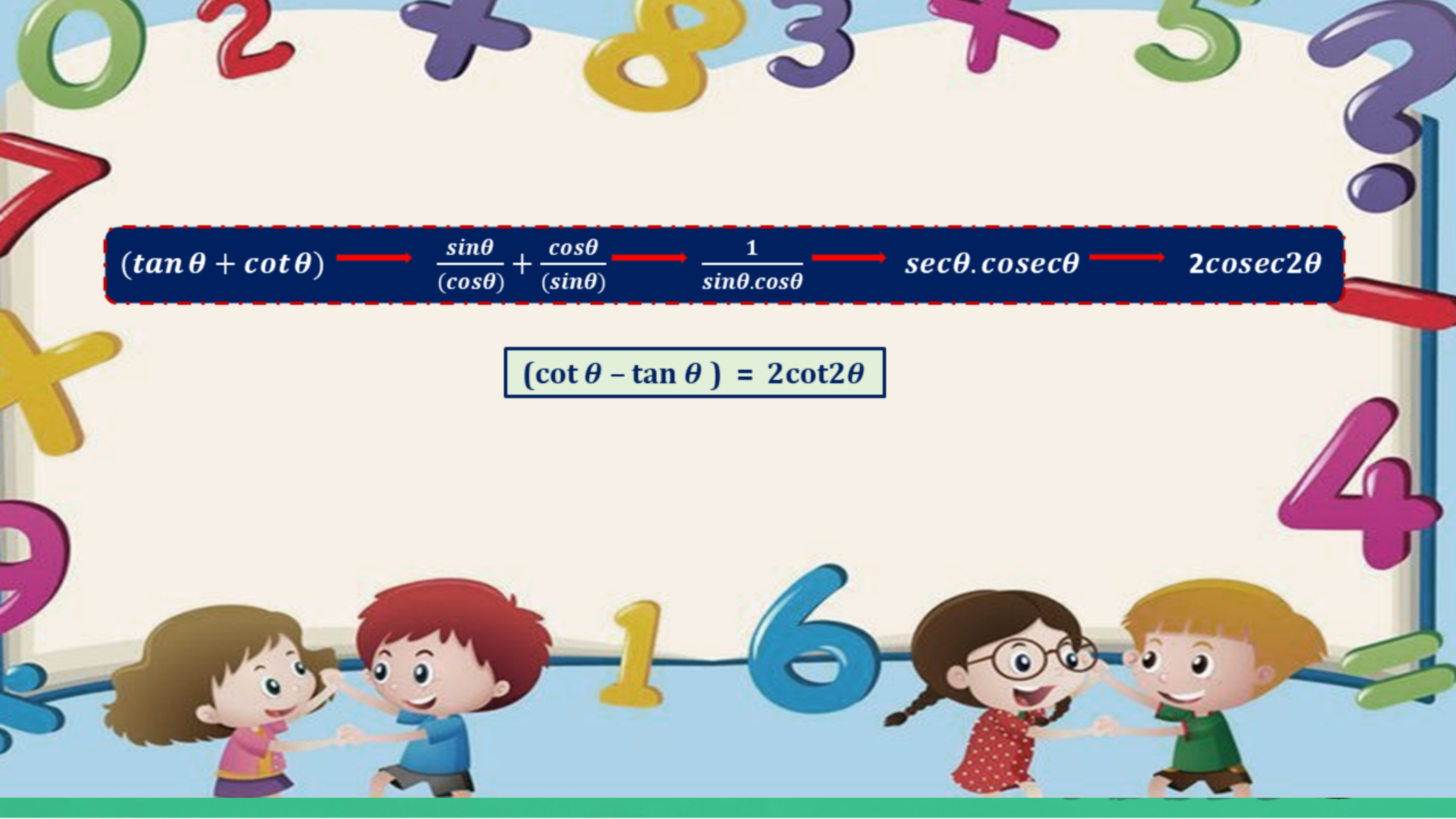
$$\tan^2\theta - \sin^2\theta \longrightarrow \frac{\sin^2\theta}{\cos^2\theta} - \sin^2\theta \longrightarrow \frac{\sin^2\theta - \sin^2\theta \cos^2\theta}{\cos^2\theta} \longrightarrow \frac{\sin^2\theta(1 - \cos^2\theta)}{\cos^2\theta} \longrightarrow \frac{\sin^2\theta \cdot \sin^2\theta}{\cos^2\theta}$$

$$\tan^2\theta - \sin^2\theta = \tan^2\theta \cdot \sin^2\theta$$

$$\cot^2\theta - \cos^2\theta \longrightarrow \frac{\cos^2\theta}{\sin^2\theta} - \cos^2\theta \longrightarrow \frac{\cos^2\theta - \sin^2\theta \cos^2\theta}{\sin^2\theta} \longrightarrow \frac{\cos^2\theta(1 - \sin^2\theta)}{\sin^2\theta} \longrightarrow \frac{\cos^2\theta \cdot \cos^2\theta}{\sin^2\theta}$$

$$\cot^2\theta - \cos^2\theta = \cot^2\theta \cdot \cos^2\theta$$



A decorative border surrounds the slide, featuring large, colorful numbers (0, 2, 8, 3, 5, 4, 1, 6) and mathematical symbols (+, x, =, >, <, ?) in various colors like green, red, purple, yellow, and blue.
$$(tan\theta + cot\theta) \longrightarrow \frac{sin\theta}{(cos\theta)} + \frac{cos\theta}{(sin\theta)} \longrightarrow \frac{1}{sin\theta.cos\theta} \longrightarrow sec\theta.cosec\theta \longrightarrow 2cosec2\theta$$

$$(cot\theta - tan\theta) = 2cot2\theta$$





14. If $\sin\theta = \sqrt{\frac{1}{6} \sqrt{\frac{1}{6} \sqrt{\frac{1}{6} \dots \infty}}}$ Then, $\tan\theta + \cot\theta = ?$

#

यदि $\sin\theta = \sqrt{\frac{1}{6} \sqrt{\frac{1}{6} \sqrt{\frac{1}{6} \dots \infty}}}$ तो, $\tan\theta + \cot\theta = ?$

[A] $\frac{36}{\sqrt{35}}$

[C] $\frac{\sqrt{35}}{36}$

$\sin\theta = \frac{1}{6} \rightarrow \rho$
 $\rightarrow H$

$\rightarrow \sqrt{35}$

[B] $\frac{36}{35}$

[D] $\sqrt{\frac{35}{36}}$

$\frac{1}{\sqrt{35}} + \sqrt{35}$

$= \frac{36}{\sqrt{35}}$

$\sqrt{a \sqrt{a \sqrt{a \dots \infty}}} = a$

15. If $\cos A = \frac{63}{65}$, then find the value of $\tan A + \cot A$ (up to two places of decimal).
यदि $\cos A = \frac{63}{65}$, तो $\tan A + \cot A$ का मान ज्ञात कीजिए (दशमलव के दो स्थानों तक)।

SSC CHSL 2023 PRE

[A] 3.19

[C] 4.19

[B] 5.23

[D] 2.76

$$= \frac{16}{63} + \frac{63}{16}$$
$$= .25 + 4$$

$$\cos A = \frac{63}{65} \rightarrow B$$
$$65 \rightarrow H$$

$$16 \rightarrow P$$

16. If cosec $\theta = 1.25$, then $\frac{4\tan\theta - 5\cos\theta + 1}{\sec\theta + 4\cot\theta - 1} = ?$

यदि cosec $\theta = 1.25$ है, तो $\frac{4\tan\theta - 5\cos\theta + 1}{\sec\theta + 4\cot\theta - 1} = ?$

[A] 2

[C] $\frac{9}{10}$

[B] $\frac{10}{11}$

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

$$\text{Cosec} \theta = \frac{5}{4} \rightarrow H$$

$$4 \rightarrow p$$

$$3 \rightarrow B$$

$$= \frac{\frac{16}{3} - 3 + 1}{\frac{5}{3} + 3 - 1}$$

$$= \frac{\frac{16}{3} - 2}{\frac{5}{3} + 2} = \frac{\frac{10}{3}}{\frac{11}{3}} = \frac{10}{11}$$



Test



17. **Given that $\sin\theta = \frac{15}{17}$. Evaluate $\frac{15\cot\theta+17\sin\theta}{8\tan\theta+16\sec\theta}$, where $0^\circ < \theta < 90^\circ$?**

यह दिया गया है कि $\sin\theta = \frac{15}{17}$ जहाँ $0^\circ < \theta < 90^\circ$, $\frac{15\cot\theta+17\sin\theta}{8\tan\theta+16\sec\theta}$ का मूल्यांकन करें?

SSC CHSL PRE 2024

[A] **23/49**

[C] 49/26

B → 8

[B] 49/23

[D] 26/23

$$= \frac{8+15}{15+34} = \frac{23}{49}$$

$$\frac{2}{16 \times 17}$$

18. If $\sin A = \frac{5}{13}$. Then find the value of $\frac{\cos A - 2 \tan A}{\sin A + 3 \tan A}$.

यदि $\sin A = \frac{5}{13}$ है, तो $\frac{\cos A - 2 \tan A}{\sin A + 3 \tan A}$ का मान ज्ञात कीजिए।

(SSC CGL MAINS 2024)

[A] $\frac{11}{255}$
[C] $\frac{14}{255}$

$B \rightarrow 12$

[B] $\frac{12}{255}$
[D] $\frac{13}{255}$

$$\frac{\frac{12}{13} - \frac{2 \times 5}{6}}{\frac{5}{13} + \frac{5}{4}}$$

$$\frac{14}{255} = \frac{7}{78} \times \frac{58}{85}$$

19. If $\operatorname{cosec} x = 5/4$, then the value of $\frac{5\sin^2 x + 8\cot^2 x}{27\tan^2 x - 125\cos^2 x}$ is?

यदि $\operatorname{cosec} x = 5/4$ है, तो $\frac{5\sin^2 x + 8\cot^2 x}{27\tan^2 x - 125\cos^2 x}$ का मान क्या है?

SSC CGL Pre 2024

[A] $33/91$ $3 \rightarrow B$

[C] $55/87$

[B] $77/30$

[D] $99/47$

$$\frac{\frac{16}{5} + \frac{8}{2}}{48 - 45}$$

$$= \frac{77}{30}$$

20. If $\cos\theta = \frac{12}{13}$, then the value of $\frac{\sin\theta(1-\tan\theta)}{\tan\theta(1+\operatorname{cosec}\theta)}$ is:
 यदि $\cos\theta = \frac{12}{13}$ है, तो $\frac{\sin\theta(1-\tan\theta)}{\tan\theta(1+\operatorname{cosec}\theta)}$ का मान क्या होगा?

[A] $\frac{25}{78}$
 [C] $\frac{35}{108}$

[B] $\frac{35}{234}$
 [D] $\frac{25}{156}$

$$\frac{\frac{5}{13} \times \frac{7}{18}}{\frac{5}{18} \times \frac{18}{5}}$$

5 → p

$$= \frac{35}{13 \times 18}$$

21. If $\sin A = \frac{2}{3}$, then find the value of $(7 - \tan A)(3 + \cos A)$.
 यदि $\sin A = \frac{2}{3}$ है, तो $(7 - \tan A)(3 + \cos A)$ का मान ज्ञात कीजिए।

(SSC CPO 2023)

[A] $\frac{61}{3} + \frac{17}{\sqrt{5}}$

[C] $\frac{61}{3} + \frac{17}{3\sqrt{5}}$

[B] $\frac{61}{3} - \frac{17}{3\sqrt{5}}$

[D] $\frac{61}{3\sqrt{5}} + \frac{17}{3}$

$$B = \sqrt{3^2 - 2^2} = \sqrt{5}$$

$$\left(7 - \frac{2}{\sqrt{5}}\right) \cdot \left(3 + \frac{\sqrt{5}}{3}\right)$$

$$= \frac{7\sqrt{5}}{3} \times \frac{6}{\sqrt{5}}$$

$$= \frac{17}{3\sqrt{5}}$$



22. If $\sin\theta = \frac{a}{\sqrt{a^2+b^2}}$, $0^\circ < \theta < 90^\circ$, then the value of $\sec\theta + \tan\theta$ is:

यदि $\sin\theta = \frac{a}{\sqrt{a^2+b^2}}$, $0^\circ < \theta < 90^\circ$, तो $\sec\theta + \tan\theta$ का मान है-

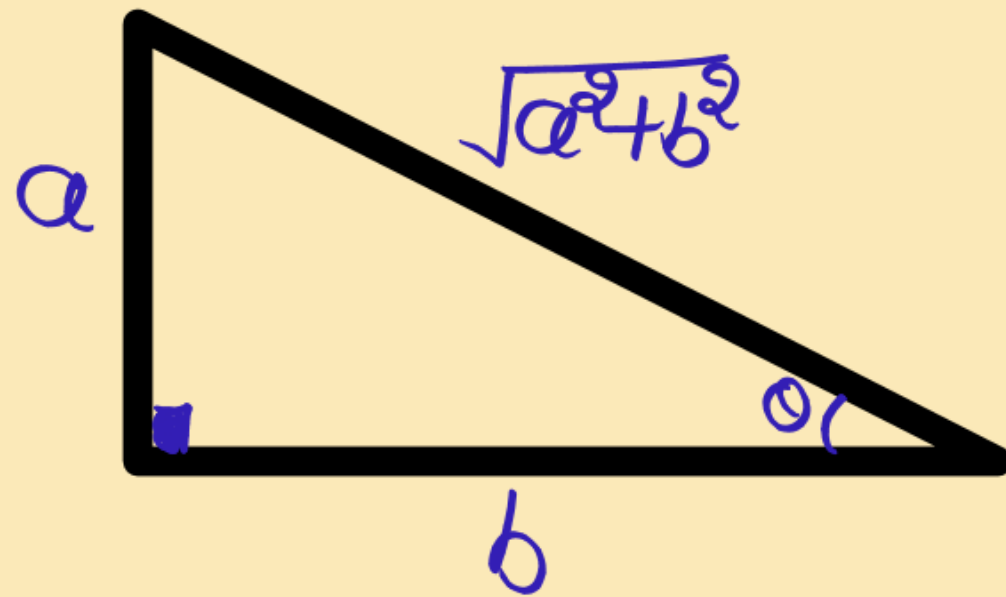
[A] $\frac{\sqrt{a^2+b^2}+a}{b}$

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

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

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

$$\frac{\sqrt{a^2+b^2}}{b} + \frac{a}{b}$$



23. If $\sin\theta = \frac{2xy}{x^2+y^2}$, then find $\tan\theta$?

यदि $\sin\theta = \frac{2xy}{x^2+y^2}$, तो $\tan\theta$ ज्ञात कीजिए?

(SSC CHSL 2024)

[A] $\frac{x^2+y^2}{x^2-y^2}$

[C] $\frac{x^2-y^2}{2xy}$

[B] $\frac{2xy}{x^2-y^2}$

[D] $\frac{x^2-y^2}{x^2+y^2}$

$B \rightarrow x^2 - y^2$

$a^2 - b^2, 2ab, a^2 + b^2$

24. If $\cos \theta = \frac{4x}{1+4x^2}$ then what is the value of $\sin \theta$?

यदि $\cos \theta = \frac{4x}{1+4x^2}$ $\rightarrow$ B $\rightarrow$ H $\rightarrow$ P $\rightarrow$ H का मान क्या होगा?

[A] $\frac{1+4x^2}{1-4x^2}$

[B] $\frac{1+4x^2}{4x^2}$

[C] $\frac{1-4x^2}{1+4x^2}$

[D] $\frac{1-4x^2}{4x}$

$1-4x^2, 4x, 1+4x^2$

$a=1$

$b=4x$

25. If $\sin\theta = \frac{2\sqrt{ab}}{a+b}$, $a > b > 0$, then the value of $\frac{\cos\theta+1}{\cos\theta-1}$ will be:

यदि $\sin\theta = \frac{2\sqrt{ab}}{a+b}$ है, $a > b > 0$ है, तो $\frac{\cos\theta+1}{\cos\theta-1}$ का मान ज्ञात करें।

[A] $-\frac{b}{a}$

[C] $\frac{a}{b}$

[B] $-\frac{a}{b}$

[D] $\frac{b}{a}$

$$\frac{\frac{a-b}{a+b} - 1}{\frac{a-b}{a+b} + 1}$$

$(a-b)$, $2ab$, $a+b$
 $\downarrow$
 B

$$= \frac{-\cancel{ab}}{\cancel{aa}}$$

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