

Foundation Batch



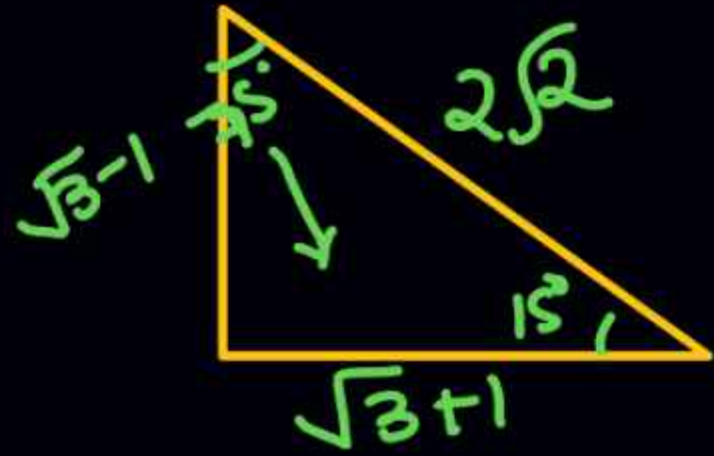
MATHS

Trigonometry

Part -8

LIVE 08-11-2024 07:00PM





What is the value of $\sin 75^\circ + \sin 15^\circ$?

$\sin 75^\circ + \sin 15^\circ$ का मान क्या है?

(a) $\sqrt{3}$

(b) $2\sqrt{3}$

☒ (c) $\sqrt{(3/2)}$

(d) $3/\sqrt{2}$

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

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

$$\boxed{\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}}$$

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



73. $\sin\left(\underbrace{\frac{\pi}{4}-A}_A\right)\sin\left(\underbrace{\frac{\pi}{4}-B}_B\right) - \cos\left(\underbrace{\frac{\pi}{4}-A}_A\right)\cos\left(\underbrace{\frac{\pi}{4}-B}_B\right) = ?$

~~(a) $\sin(A+B)$~~

~~(b) $\cos(A+B)$~~

~~(c) $-\sin(A+B)$~~

(d) $-\cos(A+B)$

$\cos(A+B) = \cos A \cos B - \sin A \sin B$

$$= \left[\cos\left(\frac{\pi}{4}-A\right)\cos\left(\frac{\pi}{4}-B\right) - \sin\left(\frac{\pi}{4}-A\right)\sin\left(\frac{\pi}{4}-B\right) \right]$$

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

$$= \cos\left[\frac{\pi}{2} - (A+B)\right]$$

$$= \sin(A+B)$$



75. What is the value of $[(\sin 59^\circ \cos 31^\circ + \cos 59^\circ \sin 31^\circ) \div (\cos 20^\circ \cos 25^\circ - \sin 20^\circ \sin 25^\circ)]$?

$[(\sin 59^\circ \cos 31^\circ + \cos 59^\circ \sin 31^\circ) \div (\cos 20^\circ \cos 25^\circ - \sin 20^\circ \sin 25^\circ)]$ का मान क्या है?

(a) $1/\sqrt{2}$

(b) $2/\sqrt{2}$

(c) $\sqrt{3}$

☒ (d) $\sqrt{2}$

$$[\sin(59+31)] \div (\cos(20+25))$$

$$\sin 90 \div \cos 45^\circ$$

$$1 \div \frac{1}{\sqrt{2}} \Rightarrow 1 \times \frac{\sqrt{2}}{1} = \sqrt{2}$$

SSC CGL Tier-2 (2017)



76. If $\tan A = \frac{15}{8}$ and $\tan B = \frac{7}{24}$, then $\tan(A + B)$?

यदि $\tan A = \frac{15}{8}$ तथा $\tan B = \frac{7}{24}$ है, तो $\tan(A + B)$?

(A) $\frac{416}{87}$

(B) $\frac{87}{416}$

(C) $\frac{304}{297}$

(D) $\frac{297}{304}$

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

$$\begin{aligned} & \frac{\frac{15}{8} + \frac{7}{24}}{1 - \frac{15}{8} \times \frac{7}{24}} = \frac{\frac{52}{24}}{\frac{64-35}{64}} \\ & = \frac{52 \times 64}{24 \times 29} = \frac{416}{87} \end{aligned}$$



77. $\cos(90 - A) \cdot \sin[\pi - (A - B)] + \sin(90 - A) \cos[\pi - (B - A)] = ?$

$$\sin A \cdot \sin(A - B) + \cos A \cdot -\cos(B - A)$$

(a) $-\sin B$

$$\sin A \cdot \sin(A - B) - \cos A \cdot \cos(A - B)$$

(b) $-\cos B$

(c) $\cos A$

$$\because \cos(A + B) = \cos A \cos B - \sin A \sin B$$

(d) $\tan B$

$$- [\cos A \cos(A - B) - \sin A \sin(A - B)]$$

~~(e) None~~

$$- \cos(A + A - B)$$

$$- \cos(2A - B)$$



77. $\cos(90 - A) \cdot \sin[\pi + (A - B)] + \sin(90 - A) \cos[\pi - (B - A)] = ?$

$$\sin A \cdot \sin(A - B) + \cos A \cdot -\cos(B - A)$$

(a) $-\sin B$ $-\sin A \cdot \sin(A - B) - \cos A \cdot \cos(A - B)$

~~(b) $-\cos B$~~

(c) $\cos A$

(d) $\tan B$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

$$= [\cos A \cos(A - B) + \sin A \sin(A - B)]$$

$$= [\cos(A - A + B)]$$

$$= \underline{\cos B}$$

$$\text{If } A+B=90^\circ$$

$$A=90-B$$

$$\sin A = \sin(90-B)$$

$$\hookrightarrow \sin A = \cos B$$

$$\hookrightarrow \sin A = \frac{1}{\sec B}$$

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

$$\hookrightarrow \frac{1}{\csc A} = \cos B \Rightarrow \csc A \cdot \cos B = 1 \quad \checkmark$$

$$\tan A = \tan(90 - B)$$

$$\tan A = \cot B$$

$$\tan A = \frac{1}{\tan B}$$

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

$$\frac{1}{\cot A} = \cot B$$

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

$$\sec A = \sec(90 - B)$$

$$\sec A = \operatorname{cosec} B$$

$$4) \boxed{\sin^2 A + \sin^2 B = 1}$$

$$4) \boxed{\cos^2 A + \cos^2 B = 1}$$



78. What will be the value of

$$\frac{\sin 39^\circ}{\cos 51^\circ} + 2 \tan 11^\circ \tan 31^\circ \tan 45^\circ \tan 59^\circ \tan 79^\circ -$$

$$3(\sin^2 21^\circ + \sin^2 69^\circ)$$

$$\frac{\sin 39^\circ}{\cos 51^\circ} + 2 \tan 11^\circ \tan 31^\circ \tan 45^\circ \tan 59^\circ \tan 79^\circ -$$

$$3(\sin^2 21^\circ + \sin^2 69^\circ) \text{ का मान कितना होगा?}$$

(a) 1 $\sin 39^\circ \sec 51^\circ + 2 \times 1 \times 1 \times 1 - 3 \times 1$

(b) 2

(c) -1

(d) 0

$$1 + 2 - 3$$

$$3 - 3 = 0$$



79. If $\tan(x+y)\tan(x-y) = 1$, then what will be the value of $\tan\left(\frac{2x}{3}\right)$?

यदि $\tan(x+y)\tan(x-y) = 1$, हो, तो $\tan\left(\frac{2x}{3}\right)$ का मान क्या होगा?

- (a) $\frac{1}{\sqrt{3}}$
- (b) $\frac{2}{\sqrt{3}}$
- (c) $\sqrt{3}$
- (d) 1

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

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

$$x + y + x - y = 90$$

$$\boxed{2x = 90^\circ}$$

$$\tan\left(\frac{90^\circ}{3}\right)$$

$$\tan 30^\circ = \frac{1}{\sqrt{3}}$$



80. Find the value of $\sin^2 15^\circ + \sin^2 25^\circ + \sin^2 35^\circ + \sin^2 45^\circ + \sin^2 55^\circ + \sin^2 65^\circ + \sin^2 75^\circ$
 $\sin^2 15^\circ + \sin^2 25^\circ + \sin^2 35^\circ + \sin^2 45^\circ + \sin^2 55^\circ + \sin^2 65^\circ + \sin^2 75^\circ$ का मान ज्ञात कीजिए।

(a) 4

(b) 7

~~(c) $\frac{7}{2}$~~

(d) $\frac{7}{3}$

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

$$3 + \frac{1}{2} = \frac{7}{2}$$



81. $\tan 7^\circ \tan 23^\circ \tan 60^\circ \tan 67^\circ \tan 83^\circ$ is equal-
 $\tan 7^\circ \tan 23^\circ \tan 60^\circ \tan 67^\circ \tan 83^\circ$ बराबर है-

(a) 0

(b) $\sqrt{3}$

(c) $\frac{1}{\sqrt{3}}$

(d) 1

$$1 \times 1 \times \sqrt{3} = \sqrt{3}$$



82. If $\tan 2\theta \cdot \tan 4\theta = 1$, then what will be the value of $\tan 3\theta$?

यदि $\tan 2\theta \cdot \tan 4\theta = 1$, तो $\tan 3\theta$ का मान क्या होगा?

(a) $\sqrt{3}$

(b) 0

(c) 1

(d) $\frac{1}{\sqrt{3}}$

$$2\theta + 4\theta = 90^\circ$$

$$6\theta = 90^\circ$$

$$\underline{\theta = 15^\circ}$$

$$\tan (15 \times 3)$$

$$\tan 45 = 1$$



83. The value of $\cot 10^\circ \cdot \cot 20^\circ \cdot \cot 60^\circ \cot 70^\circ \cdot \cot 80^\circ$ is-

$\cot 10^\circ \cdot \cot 20^\circ \cdot \cot 60^\circ \cot 70^\circ \cdot \cot 80^\circ$ का मान है-

(a) 1

(b) -1

(c) $\sqrt{3}$

(d) $\frac{1}{\sqrt{3}}$

$$1 \times 1 \times \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$



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MATHS



84. $\left[\frac{\operatorname{cosec} 31^\circ - \sec 59^\circ}{(\sin 18^\circ \div \cos 72^\circ)} \times \frac{\tan 26^\circ}{\cot 64^\circ} \right] + \left[\frac{\tan 30^\circ + \tan 15^\circ}{(1 - \tan 30^\circ \tan 15^\circ)} \right] = \text{---}$

(a) -1

(b) 1

(c) 2

(d) 0

$\tan 26^\circ \tan 64^\circ$

$\downarrow$
①

$\tan(30^\circ + 15^\circ)$

$\tan 45^\circ$
 $= 1$

$\frac{\operatorname{cosec}(90^\circ - 59^\circ) - \sec 59^\circ}{\sin 18^\circ \div \cos 72^\circ}$

$\sin 18^\circ \div \cos 72^\circ$

$\sec 59^\circ - \sec 59^\circ$

$\frac{\sec 59^\circ - \sec 59^\circ}{\sin 18^\circ \div \cos 72^\circ}$

$0 \times 1 + 1 = 1$

SSC CHSL PRE 2024 = 0



85. If $\sin \alpha \sec(30^\circ + \alpha) = 1$ ($0 < \alpha < 60^\circ$), then the value of $\sin \alpha + \cos 2\alpha$ is-

यदि $\sin \alpha \sec(30^\circ + \alpha) = 1$ ($0 < \alpha < 60^\circ$), तो $\sin \alpha + \cos 2\alpha$ का मान है-

(a) 1

(b) $\frac{2+\sqrt{3}}{2\sqrt{3}}$

(c) 0

(d) $\sqrt{2}$

$$\alpha + 30 + \alpha = 90^\circ$$

$$2\alpha = 60$$

$$\alpha = 30^\circ$$

$$\sin \alpha + \cos 2\alpha$$

$$\sin 30^\circ + \cos 60^\circ$$

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



1 2 85.4 $\sin^2 5^\circ + \sin^2 6^\circ + \dots + \sin^2 84^\circ + \sin^2 85^\circ = ?$

(a) $39\frac{1}{2}$

~~(b) $40\frac{1}{2}$~~

(c) 40

(d) $39\frac{1}{\sqrt{2}}$

no. of terms = $\frac{\text{last}^{\text{term}} - \text{first term}}{\text{Common diff}} + 1$

$$\frac{85 - 5}{1} + 1$$

$$80 + 1 = 81$$

$$\underline{\text{Ans}} = \frac{\text{No. of terms}}{2} = \frac{81}{2} = 40.5$$



86. $\sin^2 5^\circ + \sin^2 6^\circ + \dots + \sin^2 84^\circ + \sin^2 85^\circ = ?$

(a) $39\frac{1}{2}$

~~(b) $40\frac{1}{2}$~~

(c) 40

(d) $39\frac{1}{\sqrt{2}}$

$1 + 1 + \dots + 40\text{ terms} + \sin^2 45^\circ$

$40 + \frac{1}{2}$

$= 40\frac{1}{2}$



87. What will be the value of $(\sin^2 1^\circ + \sin^2 3^\circ + \sin^2 5^\circ + \dots + \sin^2 85^\circ + \sin^2 87^\circ + \sin^2 89^\circ)$
 $(\sin^2 1^\circ + \sin^2 3^\circ + \sin^2 5^\circ + \dots + \sin^2 85^\circ + \sin^2 87^\circ + \sin^2 89^\circ)$ का मान कितना होगा?

(a) $21\frac{1}{2}$

(b) 22

(c) $22\frac{1}{2}$

(d) $23\frac{1}{2}$

No. of terms = $\frac{89-1}{2} + 1$

$\frac{88}{2} + 1 = 44 + 1 = 45$

Ans = $\frac{45}{2} = 22\frac{1}{2}$



88. If $\sec(7\theta + 28^\circ) = \operatorname{cosec}(30^\circ - 3\theta)$, then what will be the value of θ ?

यदि $\sec(7\theta + 28^\circ) = \operatorname{cosec}(30^\circ - 3\theta)$ हो, तो θ का मान कितना होगा?

(a) 8°

if $A + B = 90^\circ$

(b) 5°

$\sec A = \operatorname{cosec} B$

(c) 60°

(d) 9°

$$7\theta + 28 + 30 - 3\theta = 90$$

$$4\theta = 90 - 58$$

$$4\theta = 32 \quad \theta = 8^\circ$$



89. If $0 < x < \frac{\pi}{2}$ and $\sec x = \operatorname{cosec} y$ then what will be $\sin(x + y)$?

यदि $0 < x < \frac{\pi}{2}$ तथा $\sec x = \operatorname{cosec} y$ हो तो $\sin(x + y)$ कितना होगा ?

(a) 0

(b) 1

(c) $\frac{1}{2}$

(d) $\frac{1}{\sqrt{3}}$

$$x + y = 90^\circ$$

$$\begin{aligned} &\downarrow \\ &\sin 90^\circ \\ &= 1 \end{aligned}$$



90. The value of $\cot \frac{\pi}{20} \cot \frac{3\pi}{20} \cot \frac{5\pi}{20} \cot \frac{7\pi}{20} \cot \frac{9\pi}{20}$ is-

$\cot \frac{\pi}{20} \cot \frac{3\pi}{20} \cot \frac{5\pi}{20} \cot \frac{7\pi}{20} \cot \frac{9\pi}{20}$ का मान है-

(a) -1

(b) $\frac{1}{2}$

(c) 0

(d) 1

$$1 \times 1 \times \cot \frac{\pi}{4}$$

$$1 \times 1 \times 1 = 1$$

$$A + B = 90^\circ = \frac{\pi}{2} \quad \frac{\frac{\pi}{20}}{20} + \frac{9\pi}{20} = \frac{10\pi}{20} = \frac{\pi}{2}$$

$$\frac{3\pi}{20} + \frac{7\pi}{20} = \frac{10\pi}{20} = \frac{\pi}{2}$$



91. Consider the following: निम्न पर विचार करें:

1. $\frac{\cos 75^\circ}{\sin 15^\circ} + \frac{\sin 12^\circ}{\cos 78^\circ} - \frac{\cos 18^\circ}{\sin 72^\circ} = 1$

$1 + 1 - 1 = 1$

2. $\frac{\cos 35^\circ}{\sin 55^\circ} - \frac{\sin 11^\circ}{\cos 79^\circ} + \cos 28^\circ \operatorname{cosec} 62^\circ = 1$

3. $\frac{\sin 80^\circ}{\cos 10^\circ} - \sin 59^\circ \sec 31^\circ = 0$

$1 - 1 + 1 = 1$

$1 - 1 = 0$

Which of the above are correct?

उपरोक्त में से कौन सा सही है?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

CDS [2016-II]

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

$$\frac{\sin A}{\cos B} = 1$$



92. What is the value of $\sin 24^\circ \sin 66^\circ - \cos 24^\circ \cos 66^\circ + \tan 24^\circ \tan 66^\circ - \cot 24^\circ \cot 66^\circ$?
 $\sin 24^\circ \sin 66^\circ - \cos 24^\circ \cos 66^\circ + \tan 24^\circ \tan 66^\circ - \cot 24^\circ \cot 66^\circ$ का मान क्या है?

(a) 0

(b) 1

(c) 2

(d) 3

$$24 + 66 = 90^\circ$$

$$- [\cos 24^\circ \cos 66^\circ - \sin 24^\circ \sin 66^\circ] + 1 - 1$$

$$- [\cos (24 + 66)] + 0$$
$$- \cos 90^\circ = 0$$



93. What is the value of $\frac{\cos^2 32^\circ + \cos^2 58^\circ}{\sec^2 50^\circ - \cot^2 40^\circ} + 4 \tan 13^\circ \tan 37^\circ \tan 53^\circ \tan 77^\circ$?

$\frac{\cos^2 32^\circ + \cos^2 58^\circ}{\sec^2 50^\circ - \cot^2 40^\circ} + 4 \tan 13^\circ \tan 37^\circ \tan 53^\circ \tan 77^\circ$ का मान क्या है?

$$4 \times 1 \times 1 = 4$$

$$(a) \ 2 \quad \frac{1}{\sec^2 50^\circ - \tan^2 50^\circ} + 4$$

(b) 3

$$(c) \ 4 \quad \frac{1}{1} + 4$$

~~(d) 5~~

$$1 + 4 = 5$$

$$\cot 40^\circ = \tan 50^\circ$$

$$\cot(90^\circ - 50^\circ) = \tan 50^\circ$$

CDS[2023-I]



94. If $\tan \theta \cdot \tan 2\theta = 1$, then the value of $\sin^2 2\theta + \tan^2 2\theta$ is.

यदि $\tan \theta \cdot \tan 2\theta = 1$, तो $\sin^2 2\theta + \tan^2 2\theta$ का मान है।

(a) $\frac{3}{4}$

(b) $\frac{10}{3}$

~~(c) $3\frac{3}{4}$~~

(d) 3

$3\theta = 90^\circ$

$\theta = 30^\circ$

$\sin^2 60 + \tan^2 60$

$\left(\frac{\sqrt{3}}{2}\right)^2 + (\sqrt{3})^2$

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

$= \frac{15}{4}$



95. If θ is a positive acute angle, and $\tan 2\theta \tan 3\theta = 1$, then what is the value of $\left(2\cos^2 \frac{5\theta}{2} - 1\right)$?

यदि θ एक धनात्मक न्यूनकोण हो, और $\tan 2\theta \tan 3\theta = 1$ हो, तो $\left(2\cos^2 \frac{5\theta}{2} - 1\right)$ का मान कितना होगा?

(a) $-\frac{1}{2}$

(b) 1

(c) 0

(d) $\frac{1}{2}$

$$2\cos^2\left(\frac{90}{2}\right) - 1$$

$$2\cos^2 45^\circ - 1$$

$$2 \times \frac{1}{2} - 1 = 0$$

$$5\theta = 90^\circ$$

$$\theta = 18^\circ$$



96. If $\sin(3x - 20^\circ) = \cos(3y + 20^\circ)$, then what will be the value of $(x+y)$?

यदि $\sin(3x - 20^\circ) = \cos(3y + 20^\circ)$ हो, तो $(x+y)$ का मान कितना होगा?

(a) 20°

(b) 30°

(c) 40°

(d) 45°

$$3x - 20 + 3y + 20 = 90^\circ$$

$$3(x+y) = 90^\circ$$

$$x+y = 30^\circ$$



98. What is the value of $(\sin^2 25^\circ + \sin^2 65^\circ)$?

$(\sin^2 25^\circ + \sin^2 65^\circ)$ का मान कितना होगा?

(a) $\frac{\sqrt{3}}{2}$

~~(b) 1~~

(c) 0

(d) $\frac{2}{\sqrt{3}}$

$= 1$



99. What is the numerical value of

$$\cot 18^\circ \left(\cot 72^\circ \cos^2 22^\circ + \frac{1}{\tan 72^\circ \sec^2 68^\circ} \right)$$

$$\cot 18^\circ \left(\cot 72^\circ \cos^2 22^\circ + \frac{1}{\tan 72^\circ \sec^2 68^\circ} \right) \text{ का संख्यात्मक}$$

मान कितना है?

(a) 1

(b) $\sqrt{2}$

(c) 3

(d) $\frac{1}{\sqrt{3}}$

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

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

$$(1) \times$$

$$(1) = 1$$



100. The value of $\left(\sin^2 7\frac{1}{2}^\circ + \sin^2 82\frac{1}{2}^\circ + \tan^2 2^\circ \cdot \tan^2 88^\circ\right)$ is:

$\left(\sin^2 7\frac{1}{2}^\circ + \sin^2 82\frac{1}{2}^\circ + \tan^2 2^\circ \cdot \tan^2 88^\circ\right)$ का मान है :

(a) 1

✓ (b) 2

(c) 0

(d) 4

1

+

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

$$1 + 1 = 2$$



101. What is the value of $\frac{\sin 43^\circ}{\cos 47^\circ} + \frac{\cos 19^\circ}{\sin 71^\circ} - 8\cos^2 60^\circ$

$\frac{\sin 43^\circ}{\cos 47^\circ} + \frac{\cos 19^\circ}{\sin 71^\circ} - 8\cos^2 60^\circ$ का मान बताइए :

(a) 0

(b) 1

(c) 2

(d) -1

$$1 + 1 - 8 \times \left(\frac{1}{2}\right)^2$$

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

$$2 - 2 = 0$$



109. What is $2\operatorname{cosec}^2 23^\circ \cot^2 67^\circ - \sin^2 23^\circ - \sin^2 67^\circ - \cot^2 67^\circ$ equal to?

$2\operatorname{cosec}^2 23^\circ \cot^2 67^\circ - \sin^2 23^\circ - \sin^2 67^\circ - \cot^2 67^\circ$
किसके बराबर है?

(a) 1

(b) $\sec^2 23^\circ$

(c) $\tan^2 23^\circ$

(d) 0

$$2 \times \operatorname{cosec}^2 23^\circ \cdot \tan^2 67^\circ$$

$$2 \times \frac{1}{\sin^2 23^\circ} \times \frac{\sin^2 67^\circ}{\cos^2 67^\circ}$$

$$2 \times \sec^2 23^\circ$$

$$2\sec^2 23^\circ - 1 - \cot^2 67^\circ$$

$$\sec^2 23^\circ + \sec^2 23^\circ - \tan^2 23^\circ$$

$$\sec^2 23^\circ + 1 - 1 = \boxed{\sec^2 23^\circ}$$



74. Find $(\alpha + \beta)$, if $\tan \alpha = \frac{m}{m+1}$ and $\tan \beta = \frac{1}{2m+1}$?

यदि $\tan \alpha = \frac{m}{m+1}$ और $\tan \beta = \frac{1}{2m+1}$ है, तो $(\alpha + \beta)$ ज्ञात कीजिये।

(a) 0

(b) $\frac{\pi}{2}$

(c) $\frac{\pi}{4}$

(d) $\frac{\pi}{6}$