

66. If $\cos^4 \alpha - \sin^4 \alpha = \frac{5}{6}$, then the value of $2\cos^2 \alpha - 1$?

अगर $(\cos^2 \alpha) - (\sin^2 \alpha) = \frac{5}{6}$ है, तो $2\cos^2 \alpha - 1$ का मान क्या होगा?

[A] $6/11$

[B] $5/6$

[C] $6/5$

[D] $11/6$

$$(\cos^2 - \sin^2) = \frac{5}{6}$$



67. If $\cos^4 \theta - \sin^4 \theta = \frac{4}{5}$, then find $\sin 4\theta$?

यदि $(\cos^2 \theta) - (\sin^2 \theta) = \frac{4}{5}$, तो $\sin 4\theta$ ज्ञात करें?

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☒ [A] 24/25

[C] 16/25

$$= 2 \sin 2\theta \cdot \cos 2\theta$$
$$= 2 \times \frac{3}{5} \times \frac{4}{5}$$

[B] 21/25

[D] 18/25

$$C^2 - S^2 = \frac{4}{5}$$

$$\cancel{6820} = \frac{4}{5}$$



68. If $\cos^4\theta - \sin^4\theta = k$, then the value of $\frac{1-k}{1+k}$ is?

यदि $(\cos^2\theta)^2 - (\sin^2\theta)^2 = k$ है, तो $\frac{1-k}{1+k}$ का मान क्या होगा?

[A] $\tan^2\theta$

[C] $\cot^2\theta$

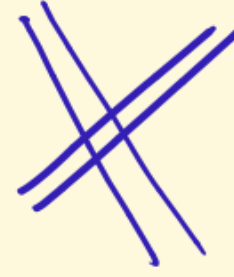
[B] $\sin^2\theta$

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

$$\cos^2\theta = k$$

$$\frac{1 - \cos^2\theta}{1 + \cos^2\theta} = \frac{\sin^2\theta}{1 + \cos^2\theta}$$





69. If $\tan\theta = \frac{4}{3}$, find the value of $\sin 3\theta$.

यदि $\tan\theta = \frac{4}{3}$ तो $\sin 3\theta$ का मान ज्ञात करें।

[RRB NTPC GRADUATE LEVEL CBT-1, 2025]

[A] $\frac{32}{45}$
[C] $\frac{64}{125}$

$$\sin\theta = \frac{4}{5}$$

[B] $\frac{44}{125}$
[D] $\frac{12}{25}$

$$\sin 3\theta = 3\sin\theta - 4\sin^3\theta$$

$$= \frac{12}{5} - 4 \times \frac{64}{125}$$

$$= \frac{300 - 256}{125} = \frac{44}{125}$$



70. If $\sin x = \frac{2}{3}$, then find the value of $\cos 3x$.

$\cos x = \sqrt{1 - \frac{4}{9}} = \frac{\sqrt{5}}{3}$ यदि $\sin x = \frac{2}{3}$ है, तो $\cos 3x$ का मान ज्ञात कीजिए।

~~[A] 0.6735~~

~~[B] -0.8765~~

~~[C] -0.5797~~

~~[D] 0.5678~~

$\sqrt{5} \approx 2.24$

$$\cos 3x = 4\cos^3 x - 3\cos x$$

$$= 4 \times \frac{5\sqrt{5}}{27} \rightarrow \sqrt{5}$$

$$= \frac{-7\sqrt{5}}{27} \approx -\frac{16}{27}$$



71. If $\cot A = \frac{3}{4}$, then find the value of $3\sin 2A - \cos 3A$ is:
 यदि $\cot A = \frac{3}{4}$ है, तो $3\sin 2A - \cos 3A$ का मान ज्ञात कीजिए।

(RRB GROUP-D 2025)

[A] $\frac{437}{125}$
 [C] $\frac{417}{125}$

5 → H

[B] $\frac{497}{125}$
 [D] $\frac{477}{125}$

$$\frac{72}{25} + \frac{117}{125} = \frac{360 + 117}{125}$$

$$\sin 2A = 2 \times \frac{4}{5} \times \frac{3}{5} = \frac{24}{25}$$

$$\cos 3A = 4\cos^3 A - 3\cos A$$

$$= 4 \times \frac{27}{125} - \frac{9}{5} = \frac{108 - 225}{125} = -\frac{117}{125}$$



72. If $\sin(x) = \frac{2}{5}$ and x is an acute angle, find the exact values of $\cos(4x) - \cos(2x)$.

अगर $\sin(x) = 2/5$ है और x एक न्यून कोण (acute angle) है, तो $\cos(4x) - \cos(2x)$ का सही मान ज्ञात कीजिए।

[A] $\frac{625}{472}$
[C] $-\frac{472}{625}$

[B] $-\frac{472}{625}$
[D] $-\frac{472}{625}$

$$-\frac{47}{625} - \frac{17 \times 25}{25 \times 25}$$

$$\begin{aligned}\cos 2x &= 1 - 2\sin^2 x \\ &= 1 - 2 \times \frac{4}{25} \\ &= \frac{17}{25}\end{aligned}$$

$$\begin{aligned}\cos 4x &= 2\cos^2(2x) - 1 \\ &= 2 \times \frac{289}{625} - 1 \\ &= -\frac{47}{625}\end{aligned}$$



73. What will be the value of $\sin 10^\circ - \frac{4}{3} \sin^3 10^\circ$?
 $\sin 10^\circ - \frac{4}{3} \sin^3 10^\circ$ का मान क्या होगा?
(SSC CGL 2022)

[A] $\frac{1}{3\sqrt{3}}$

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

☒ [B] $\frac{1}{6}$

[D] $\frac{3}{6}$

$$\sin 10^\circ - \frac{4}{3} \sin^3 10^\circ$$

$$\frac{3\sin 10^\circ - 4\sin^3 10^\circ}{3} = \frac{\sin 30^\circ}{3} = \frac{1}{6}$$



74. If $\sin^6 \theta + \cos^6 \theta = \sin 2\theta$, then find $\cos 4\theta$?

यदि $\sin^6 \theta + \cos^6 \theta = \sin 2\theta$ है, तो $\cos 4\theta$ ज्ञात कीजिये?

[A] $\sqrt{5}/3$

[C] $2/3$

[C] $1/3$

[D] $1/9$

$1 - 2\sin^2(2\theta)$
 $= 1 - 2 \times \frac{4}{9} = \frac{1}{9}$

$1 - 3\cos^2 \theta$

$1 - \frac{3}{4} \times (\cos^2 \theta)^2 = \sin 2\theta$

$1 - \frac{3}{4} \sin^2 \theta = \sin 2\theta$

$4 - 3\sin^2 \theta = 4\sin 2\theta$

$3\sin^2 \theta + 4\sin 2\theta - 4 = 0$

$\sin 2\theta = -\frac{2}{3}, +\frac{2}{3}$



75. If $\tan 6\theta = \frac{4}{3}$, then find $\frac{1}{2}(4\operatorname{cosec} 2\theta - 3\sec 2\theta)$?

यदि $\tan 6\theta = \frac{4}{3}$ है, तो $\frac{1}{2}(4\operatorname{cosec} 2\theta - 3\sec 2\theta)$ ज्ञात कीजिये?

[A] 5

5 → H

[B] $\frac{5}{2}$

[C] 10

[D] 4

$$\begin{aligned} &= \frac{1}{2} \left(\frac{4}{\sin 2\theta} - \frac{3}{\cos 2\theta} \right) \\ &= \frac{5}{2} \times \frac{\frac{4}{5} \cos 2\theta - \frac{3}{5} \sin 2\theta}{\sin 2\theta \cdot \cos 2\theta} \\ &= \frac{5(\cancel{\sin 2\theta \cdot \cos 2\theta} - \cancel{\cos 2\theta \cdot \sin 2\theta})}{\cancel{\sin 2\theta}} \\ &= 5 \end{aligned}$$





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

$$\tan(45^\circ + \theta) = \frac{1+\tan\theta}{1-\tan\theta} = \frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}$$

$$\tan(45^\circ - \theta) = \frac{1-\tan\theta}{1+\tan\theta} = \frac{\cos\theta-\sin\theta}{\cos\theta+\sin\theta}$$



$$\tan(15+13) = \frac{1+\tan 13^\circ}{1-\tan 13^\circ}$$

76. Simplify $\frac{\cos 13^\circ + \sin 13^\circ}{\cos 13^\circ - \sin 13^\circ}$ को हल कीजिए।

SSC CPO 2024

[A] $\cot 58^\circ$

[B] $\tan 32^\circ$

[C] $\tan 58^\circ$

[D] $\cos 26^\circ$

$$= \cot 13^\circ$$



77. $\frac{\cos 11^\circ - \sin 11^\circ}{\cos 11^\circ + \sin 11^\circ} = \cot 4\theta$, then $\theta = ?$

[A] 11°

[C] 9°

☒ [B] 14°

[D] 16°

$\tan(45^\circ - 11^\circ)$

$\tan 34^\circ = \cot 4\theta$

$4\theta = 56^\circ$

$\theta = 14^\circ$





$$\tan 70^\circ = \tan(20^\circ + 50^\circ)$$

$$\tan 70^\circ = \frac{\tan 20^\circ + \tan 50^\circ}{1 - \tan 20^\circ \cdot \tan 50^\circ}$$

$$\tan 70^\circ - \tan 50^\circ = \tan 20^\circ + \tan 50^\circ$$

$$\tan 70^\circ = \tan 20^\circ + 2 \tan 50^\circ$$

78. $\tan 70^\circ = ?$

[A] $2 \tan 20^\circ + \tan 50^\circ$

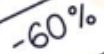
[B] $2 \tan 50^\circ + \tan 20^\circ$

[C] $2 \tan 50^\circ \tan 20^\circ$

[D] None

$$\tan 70^\circ \times \tan 20^\circ = 1$$





If, $A + B = 45^\circ$ or 225°

$$(1+\tan A) \cdot (1+\tan B)=2$$
$$(1-\cot A) \cdot (1-\cot B)=2$$
$$(V \cdot V \cdot V \cdot V \cdot V \cdot V)$$

$$\tan 45^\circ = \tan 225^\circ = 1$$

$$1 + \partial e + y + \partial y = (1 + \partial e) \cdot (1 + y)$$

Proof→

$$\tan (A+B) = \tan 45^\circ$$

$$\frac{\tan A + \tan B}{1 - \tan A \cdot \tan B} \Rightarrow 1$$

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

दोनों तरफ 1 Add करने पर

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

$$(1+\tan A)(1+\tan B) = 2$$

79. The value of $\tan 100^\circ + \tan 125^\circ + \tan 100^\circ \tan 125^\circ$ is equal to _____.

$\tan 100^\circ + \tan 125^\circ + \tan 100^\circ \tan 125^\circ$ का मान _____ के बराबर है।

[RRB NTPC - 2021]

[A] 0

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

[B] -1

[D] 1



80. $(1 + \tan 8^\circ)(1 + \tan 37^\circ) = ?$

SSC CHSL PRE 2024

[A] 1

[C] 3

[B] 2

[D] 4

$$8^\circ + 37^\circ = 45^\circ$$



81. If $(1 + \tan \alpha)(1 + \tan 4\alpha) = 2$, $\alpha \in \left(0, \frac{\pi}{16}\right)$ then find the value of α .
यदि $(1 + \tan \alpha)(1 + \tan 4\alpha) = 2$, $\alpha \in \left(0, \frac{\pi}{16}\right)$ है, तो α का मान ज्ञात कीजिए।

RRB NTPC 2021

[A] $\frac{\pi}{30}$
[C] $\frac{\pi}{40}$

[B] $\frac{\pi}{20}$
[D] $\frac{\pi}{60}$

$$\alpha + 4\alpha = 45^\circ$$

$$5\alpha = \frac{\pi}{4}$$



82. $(1 + \tan 1^\circ)(1 + \tan 2^\circ)(1 + \tan 3^\circ) \dots \dots \dots (1 + \tan 44^\circ)(1 + \tan 45^\circ) = ?$

[A] 2^{21}

[B] 2^{22}

[C] 2^{23}

[D] 2^{24}

$2^{22} \times 2$

44 terms
= 22 pairs



84. Find the value of $(\cot 13^\circ - 1)(\cot 32^\circ - 1)$?

$(\cot 13^\circ - 1)(\cot 32^\circ - 1)$ का मान ज्ञात कीजिए?

[A] 1

[B] 2

[C] 3

[D] -2


$$(1 - \cot 13^\circ)(1 - \cot 32^\circ)$$



85. Calculate $4(1 - \cot 10^\circ)(1 + \cot 145^\circ) = ?$

[A] 4

[B] - 8

[C] 8

[D] 12

$$= 4 \cdot \underbrace{(1 - \cot 10^\circ)(1 - \cot 35^\circ)}_2$$

$$\begin{aligned}\cot 145^\circ &= \cot(180^\circ - 35^\circ) \\ &= -\cot 35^\circ\end{aligned}$$



86. If $A + B = 585^\circ$, then find the value of $\left(\frac{\tan A}{1 - \tan A}\right)\left(\frac{\tan B}{1 - \tan B}\right)$?

यदि $A + B = 585^\circ$ है, तो $\left(\frac{\tan A}{1 - \tan A}\right)\left(\frac{\tan B}{1 - \tan B}\right)$ का मान ज्ञात कीजिये?

[A] 2

[C] 4

[B] 0.5

[D] 1

$$360^\circ = 0^\circ$$

$$\frac{1}{(\tan A - 1)} \times \frac{1}{(\tan B - 1)}$$
$$= \frac{1}{2}$$



83. Find the value of $\tan 72^\circ - \tan 27^\circ - \tan 72^\circ \tan 27^\circ$.

$\tan 72^\circ - \tan 27^\circ - \tan 72^\circ \tan 27^\circ$ का मान ज्ञात कीजिए।

[A] -1

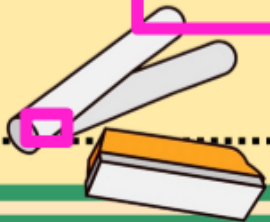
[C] -2

☒ [B] 1

[D] 0

$$\underset{A}{72^\circ} - \underset{B}{27^\circ} = 45^\circ$$

H, $\underset{45^\circ - 0^\circ}{A - B} = 45^\circ$ तो $\tan A - \tan B - \tan A \cdot \tan B = ?$
 $1 - 0 - 0 = 1$



88. Find $\tan 19^\circ 40' + \tan 40^\circ 20' + \sqrt{3} \tan 19^\circ 40' \tan 40^\circ 20'$?

$\tan 19^\circ 40' + \tan 40^\circ 20' + \sqrt{3} \tan 19^\circ 40' \tan 40^\circ 20'$ ज्ञात कीजिये?

[A] $\frac{\sqrt{3}}{4}$

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

[C] $\sqrt{3}$

[D] 1

$$19^\circ 40' + 40^\circ 20' = 60^\circ$$

$$\text{H, } A + B = 60^\circ$$

$$\text{तो } \tan A + \tan B + \sqrt{3} \tan A \cdot \tan B = ?$$

$$\sqrt{3} + 0 + 0$$

$$= \sqrt{3}$$

$$1^\circ = 60'$$



87. Find the value of $\frac{\tan 35^\circ + \tan 25^\circ + \sqrt{3} \tan 25^\circ \tan 35^\circ}{\tan 19^\circ + \tan 26^\circ + \tan 19^\circ \tan 26^\circ}$?

~~$\frac{\tan 35^\circ + \tan 25^\circ + \sqrt{3} \tan 25^\circ \tan 35^\circ}{\tan 19^\circ + \tan 26^\circ + \tan 19^\circ \tan 26^\circ}$~~

$\frac{\tan 19^\circ + \tan 26^\circ + \tan 19^\circ \tan 26^\circ}{\tan 19^\circ + \tan 26^\circ + \tan 19^\circ \tan 26^\circ}$

का मान ज्ञात कीजिए?

[A] $-\sqrt{3}$

[C] 2

☒ [B] $\sqrt{3}$

[D] 1

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

$35^\circ + 25^\circ = 60^\circ$

$A + B = 60^\circ$
 $60^\circ \quad 0^\circ$



89. $\tan \frac{2\pi}{5} - \tan \frac{\pi}{15} - \sqrt{3} \tan \frac{2\pi}{5} \tan \frac{\pi}{15} = ?$

[A] 1

[B] $\sqrt{2}$

[C] 0

[D] $\sqrt{3}$

$$\frac{2\pi}{5} = 72^\circ$$

$$\frac{\pi}{15} = 12^\circ$$

$$\frac{2\pi}{5} - \frac{\pi}{15} = 60^\circ$$

If $A - B = 60^\circ$

तो $\tan A - \tan B - \sqrt{3} \tan A \tan B = ?$



90. $(\sqrt{3} + \tan 17^\circ)(\sqrt{3} + \tan 13^\circ)(\sqrt{3} + \tan 11^\circ)(\sqrt{3} + \tan 19^\circ) = ?$

[A] 4

[C] 8

[B] 16

[D] 9

H, $A + B = 30^\circ$
 $30^\circ \quad 0^\circ$

$(\sqrt{3} + \tan A)(\sqrt{3} + \tan B) = ?$

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

