

If  $A + B = 90^\circ \rightarrow A, B$  are complementary to each other

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

$$\tan A = \cot B \Rightarrow \tan A \cdot \tan B = 1 \quad (\text{or}) \quad \cot A \cdot \cot B = 1$$

$$\sec A = \operatorname{cosec} B \Rightarrow \cos A \cdot \operatorname{cosec} B = 1$$

$$\sin^2 A + \sin^2 B = 1$$

$$\cos^2 A + \cos^2 B = 1$$

191. The value of  $\frac{\sqrt{2}\tan(60^\circ-\theta)\tan(30^\circ+\theta)}{\sin^2(45^\circ+\theta)+\sin^2(45^\circ-\theta)}$  is

~~$\frac{\sqrt{2}\tan(60^\circ-\theta)\tan(30^\circ+\theta)}{\sin^2(45^\circ+\theta)+\sin^2(45^\circ-\theta)}$~~  का मान ज्ञात करें।

**SSC CGL 2022 PRE**

[A]  $\frac{1}{\sqrt{2}}$

[C] 2

[B] 1

☒ [D]  $\sqrt{2}$

$\sqrt{2}$

✗





192. The value of  $\operatorname{cosec}(58^\circ + \theta) - \sec(32^\circ - \theta) + \sin 15^\circ \sin 35^\circ \sec 55^\circ \sin 30^\circ \sec 75^\circ$  is:

$\operatorname{cosec}(58^\circ + \theta) - \sec(32^\circ - \theta) + \sin 15^\circ \sin 35^\circ \sec 55^\circ \sin 30^\circ \sec 75^\circ$  का मान ज्ञात कीजिए।

[A] 1

[B] 2

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

[D] 0

2





193. Find the value of  $\sec^2 18^\circ - \cot^2 72^\circ + \sin^2 30^\circ + \operatorname{cosec}^2 60^\circ - \operatorname{cosec}^2 18^\circ + \tan^2 72^\circ$ .

$\sec^2 18^\circ - \cot^2 72^\circ + \sin^2 30^\circ + \operatorname{cosec}^2 60^\circ - \operatorname{cosec}^2 18^\circ + \tan^2 72^\circ$  का मान ज्ञात कीजिए।  
(RRB GROUP-D 2025)

[A]  $\frac{19}{11}$

[B]  $\frac{12}{19}$

[C]  $\frac{10}{19}$

[D]  $\frac{19}{12}$

$$\cancel{1} + \frac{1}{4} + \frac{4}{3} - \cancel{1}$$

$$= \frac{19}{12}$$

$$- (\operatorname{cosec}^2 18^\circ - \tan^2 18^\circ)$$

194. Evaluate :  $\frac{\sec 33^\circ}{\operatorname{cosec} 57^\circ} + \sqrt{3} \cot 13^\circ \cot 21^\circ \cot 60^\circ \cot 69^\circ \cot 77^\circ - 2(\sin^2 41^\circ + \sin^2 49^\circ)$   
 ~~$\frac{\sec 33^\circ}{\operatorname{cosec} 57^\circ} + \sqrt{3} \cot 13^\circ \cot 21^\circ \cot 60^\circ \cot 69^\circ \cot 77^\circ - 2(\sin^2 41^\circ + \sin^2 49^\circ)$~~  का मान ज्ञात कीजिए।  
(RRB GROUP-D 2025)

[A] 0

[B] 5

[C] 1

[D] 2

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

$$2 - 2$$

$$= 0$$



195. Find the value of  $2\operatorname{cosec}^2 23^\circ \cot^2 67^\circ - \sin^2 23^\circ - \sin^2 67^\circ - \cot^2 67^\circ$ .

$2\operatorname{cosec}^2 23^\circ \cot^2 67^\circ - (\sin^2 23^\circ + \sin^2 67^\circ) - \cot^2 67^\circ$  का मान ज्ञात कीजिए।

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[A]  $\sec^2 23^\circ$

[B] 1

[C]  $\tan^2 23^\circ$

[D] 0

$$\begin{aligned} & 2\sec^2 23^\circ - \cot^2 67^\circ \\ &= 2\sec^2 23^\circ - \sec^2 23^\circ \end{aligned}$$

196. What is the value of  $\frac{\operatorname{cosec}(78^\circ + \theta) - \operatorname{cosec}(12^\circ - \theta) - \tan(67^\circ + \theta) + \cot(23^\circ - \theta)}{\tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ}$  ?

$\frac{\operatorname{cosec}(78^\circ + \theta) - \operatorname{cosec}(12^\circ - \theta) - \tan(67^\circ + \theta) + \cot(23^\circ - \theta)}{\tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ}$  का मान क्या है?

SSC CGL 2020 PRE

[A] 1

[C] 2

✓ [B] 0

[D] -1

0



197. The value of  $\frac{4\tan^2 30^\circ + \sin^2 30^\circ \cos^2 45^\circ + \sec^2 48^\circ - \cot^2 42^\circ}{\cos 37^\circ \sin 53^\circ + \sin 37^\circ \cos 53^\circ + \tan 18^\circ \tan 72^\circ}$  is:

$4\tan^2 30^\circ + \sin^2 30^\circ \cos^2 45^\circ + \sec^2 48^\circ - \cot^2 42^\circ$  का मान ज्ञात करें।

$\cos 37^\circ \sin 53^\circ + \sin 37^\circ \cos 53^\circ + \tan 18^\circ \tan 72^\circ$

[A]  $\frac{35}{48}$

[C]  $\frac{49}{24}$

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

$\sin(53^\circ + 37^\circ)$

[B]  $\frac{59}{48}$  ✓

[D]  $\frac{35}{24}$

$$\begin{aligned} & \frac{\frac{4}{3} + \frac{1}{8} + 1}{1+1} \\ &= \frac{32+3+24}{24 \times 2} \\ &= \frac{59}{48} \end{aligned}$$



198. The value of  $\frac{2\sin^2 38^\circ \sec^2 52^\circ + \cos 64^\circ \sin 26^\circ + \sin^2 64^\circ}{\tan^2 23^\circ + \cot^2 23^\circ - \sec^2 67^\circ - \operatorname{cosec}^2 67^\circ}$  is:

$\frac{2\sin^2 38^\circ \sec^2 52^\circ + \cos 64^\circ \sin 26^\circ + \sin^2 64^\circ}{\tan^2 23^\circ + \cot^2 23^\circ - \sec^2 67^\circ - \operatorname{cosec}^2 67^\circ}$  का मान ज्ञात कीजिए।

[A] -2

[C] 2

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

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

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

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

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



199. The value of  $\frac{(\sin 17^\circ + \cos 73^\circ)(\sec 73^\circ + \operatorname{cosec} 17^\circ)}{\operatorname{cosec}^2 71^\circ + \cos^2 15^\circ - \tan^2 19^\circ + \cos^2 75^\circ}$  is:

$\frac{(\sin 17^\circ + \cos 73^\circ)(\sec 73^\circ + \operatorname{cosec} 17^\circ)}{\operatorname{cosec}^2 71^\circ + \cos^2 15^\circ - \tan^2 19^\circ + \cos^2 75^\circ}$  का मान है:

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[A] 1

[B] 4

[C] -3

[D] 2

$$\frac{2 \sin 17^\circ \times 2 \sec 17^\circ}{1+1} = \frac{4}{2}$$

**200. The value of  $\frac{\tan(45^\circ - \alpha)}{\cot(45^\circ + \alpha)} - \frac{(\cos 19^\circ + \sin 71^\circ)(\sec 19^\circ + \operatorname{cosec} 71^\circ)}{\tan 12^\circ \tan 24^\circ \tan 66^\circ \tan 78^\circ}$  is:**

$\frac{\cancel{\tan(45^\circ - \alpha)}}{\cancel{\cot(45^\circ + \alpha)}} - \frac{\cancel{\cos 19^\circ} \cancel{\sin 71^\circ} \cancel{\sec 19^\circ} \cancel{\operatorname{cosec} 71^\circ}}{\cancel{\tan 12^\circ} \cancel{\tan 24^\circ} \cancel{\tan 66^\circ} \cancel{\tan 78^\circ}}$  का मान ज्ञात करें।

[A]  $-3$

[B]  $0$

[C]  $-2$

[D]  $2$

$$1 - \frac{2 \cancel{\cos 19^\circ} \times 2 \cancel{\sec 19^\circ}}{1} \\ = 1 - 4$$



**201. Evaluate the following expression.**

**दिए गए व्यंजक का मान ज्ञात करें।**

$$\frac{3(\overset{\text{Jan 44}}{\cot^2 46^\circ - \sec^2 44^\circ})}{2(\sin^2 28^\circ + \sin^2 62^\circ)} + \frac{2\cos^2 60^\circ \tan^2 33^\circ \tan^2 57^\circ}{\sec^2(90^\circ - \theta) - \cot^2 \theta}$$

**[A] -1**

**[B] 1**

**[C] -2**

**[D] 2**

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

202. The value of  $\frac{3(\operatorname{cosec}^2 26^\circ - \tan^2 64^\circ) + (\cot^2 42^\circ - \sec^2 48^\circ)}{\cot \cot (22^\circ - \phi) - \operatorname{cosec}^2 (62^\circ + \phi) - \tan \tan (\phi + 68^\circ) + \tan^2 (28^\circ - \phi)}$  is:

$\frac{3(\operatorname{cosec}^2 26^\circ - \tan^2 64^\circ) + (\cot^2 42^\circ - \sec^2 48^\circ)}{\cot (22^\circ - \phi) - \operatorname{cosec}^2 (62^\circ + \phi) - \tan (\phi + 68^\circ) + \tan^2 (28^\circ - \phi)}$  का मान है।

SSC CGL 2023 PRE

[A] 3

[C] -1

[B] 4

[D] -2

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



203. If  $6(\sec^2 59^\circ - \cot^2 31^\circ) - \frac{2}{3} \sin^2 90^\circ - 3 \tan^2 56^\circ y \tan^2 34^\circ = \frac{y}{3}$ , then the value of  $y$  is:

यदि  $6(\sec^2 59^\circ - \cot^2 31^\circ) - \frac{2}{3} \sin^2 90^\circ - 3 \tan^2 56^\circ y \tan^2 34^\circ = \frac{y}{3}$  है तो  $y$  का मान है:

[A]  $\frac{8}{5}$   
[C]  $\frac{2}{3}$

[B]  $-\frac{8}{5}$   
[D]  $-\frac{2}{3}$

$$6 - \frac{2}{3} - 3y = \frac{y}{3}$$

$$\frac{16}{3} = \frac{10y}{3}$$

$$16 = 10y$$

**204. What is the simplified value of  $\frac{\sin^3 21^\circ + \cos^3 19^\circ}{\sin 21^\circ + \cos 19^\circ} + \sin^2 69^\circ + \cos^2 71^\circ + \frac{1}{\sec 69^\circ \operatorname{cosec} 71^\circ}$  is:**

$\frac{\sin^3 21^\circ + \cos^3 19^\circ}{\sin 21^\circ + \cos 19^\circ} + \sin^2 69^\circ + \cos^2 71^\circ + \frac{1}{\sec 69^\circ \operatorname{cosec} 71^\circ}$  का सरलीकृत मान क्या है:

**SSC CGL 2018 PRE**

[A] 3

[B] 1

[C] 4

[D] 2

$$\frac{a^3 + b^3}{a + b} \Rightarrow a^2 + b^2 - ab$$

$$\cancel{\sin^2 21^\circ + \cos^2 19^\circ - \sin 21^\circ \cos 19^\circ} + \sin^2 69^\circ + \cos^2 71^\circ + \cancel{\sec 69^\circ \operatorname{cosec} 71^\circ}$$

$$1 + 1 = 2$$



**205. The value of  $\frac{\sin^3 A - \cos^3 A}{1 + \sin A \cos A} + 2\sin^2 54^\circ - \sec^2 36^\circ$  is:**

$\frac{\sin^3 A - \cos^3 A}{1 + \sin A \cos A} + 2\sin^2 54^\circ - \sec^2 36^\circ$  का मान ज्ञात कीजिए।

**(RRB NTPC 12<sup>th</sup> LEVEL 2025)**

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

[B]  $\sin A - \cos A + 2$

[C]  $\sin A \cos A + 2$

[D]  $2(1 + \sin A \cos A)$

$$\frac{(S-C) \cdot (1+\cancel{SC})}{1+\cancel{SC}} + 2$$

$$S-C+2$$

$$a^3 - b^3 = (a-b) \cdot (a^2 + b^2 + ab)$$



206. If  $\operatorname{cosec} 31^\circ = x$ , then  $\sin^2 59^\circ + \frac{1}{\operatorname{cosec}^2 31^\circ} + \tan^2 59^\circ - \frac{1}{\sin^2 59^\circ \operatorname{cosec}^2 59^\circ}$  is equal to:

अगर  $\operatorname{cosec} 31^\circ = x$ , है, तो  $\sin^2 59^\circ + \frac{1}{\operatorname{cosec}^2 31^\circ} + \tan^2 59^\circ - \frac{1}{\sin^2 59^\circ \operatorname{cosec}^2 59^\circ}$  बराबर है:

SSC CGL 2019 PRE

[A]  $\sqrt{x+1}$

[C]  $\sqrt{x-1}$

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

[D]  $\sqrt{x^2+1}$

$$\cancel{(\sin^2 59^\circ + \sin^2 31^\circ) + \tan^2 59^\circ - 1}$$

$$= \tan^2 59^\circ$$

$$= \cot^2 31^\circ = \operatorname{cosec}^2 31^\circ - 1$$

$$= x^2 - 1$$



207. If  $A+B = 90^\circ$ , then the expression  $\frac{\cot A}{\cot B} + \cos^2 A + \cos^2 B$  is equal to:

यदि  $A + B = 90^\circ$  है, तो व्यंजक  $\frac{\cot A}{\cot B} + (\cos^2 A + \cos^2 B)$  किसके बराबर है?

(SSC CPO 2023)

[A]  $\cot^2 B$

[C]  $\operatorname{cosec}^2 B$

[B]  $\operatorname{cosec}^2 A$

[D]  $\cot^2 A$

$$\frac{\cot A}{1/\cot A}$$

208. Find the value of  $\cos 47^\circ \sec 133^\circ + \sin 144^\circ \operatorname{cosec} 36^\circ$ .  
 $\cos 47^\circ \sec 133^\circ + \sin 144^\circ \operatorname{cosec} 36^\circ$  का मान ज्ञात कीजिए।

SSC CGL 2023 PRE

[A]  $1/2$       $-1+1$

[C]  $0$

[B]  $1$

[D]  $-1$

$$\begin{aligned}\sec 133^\circ &= \sec(180^\circ - 47^\circ) \\ &= -\sec 47^\circ\end{aligned}$$

$$\begin{aligned}\sin 144^\circ &= \sin(180^\circ - 36^\circ) \\ &= \sin 36^\circ\end{aligned}$$





209. If  $\sin 20^\circ = a$ , then find  $\frac{\sin 110^\circ - \cos 160^\circ}{\tan 200^\circ}$ ?

यदि  $\sin 20^\circ = a$  है, तो  $\frac{\sin 110^\circ - \cos 160^\circ}{\tan 200^\circ}$  ज्ञात कीजिये?

[A]  $\frac{2(1-a)}{a}$

[B]  $\frac{2(1+a)}{a}$

✓ [C]  $\frac{2(1-a^2)}{a}$

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

$\sin 110^\circ = \sin(90^\circ + 20^\circ) = \cos 20^\circ$

$\cos 160^\circ = \cos(180^\circ - 20^\circ) = -\cos 20^\circ$

$\tan 200^\circ = \tan(180^\circ + 20^\circ) = \tan 20^\circ$

$$\begin{aligned} & \frac{\cos 20^\circ - (-\cos 20^\circ)}{\tan 20^\circ} \\ &= \frac{2\cos 20^\circ}{\tan 20^\circ} = \frac{2(1-a)}{a} \end{aligned}$$



210. If  $\tan 40^\circ = \alpha$ , then find  $\frac{\tan 320^\circ - \tan 310^\circ}{1 + \tan 320^\circ \cdot \tan 310^\circ}$ ?

यदि  $\tan 40^\circ = \alpha$  है, तो  $\frac{\tan 320^\circ - \tan 310^\circ}{1 + \tan 320^\circ \cdot \tan 310^\circ}$  का मान ज्ञात कीजिए?

[A]  $\frac{1 - \alpha^2}{\alpha}$

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

✓ [C]  $\frac{1 - \alpha^2}{2\alpha}$

[D]  $\frac{1 + \alpha^2}{\alpha}$

$$\frac{-\alpha + \frac{1}{\alpha}}{1 + 1} = \frac{-\alpha^2 + 1}{2\alpha}$$

$$\tan 320^\circ = \tan(360^\circ - 40^\circ) = -\tan 40^\circ = -\alpha$$

$$\tan 310^\circ = \tan(270^\circ + 40^\circ) = -\cot 40^\circ = -\frac{1}{\alpha}$$





**211.**

**[c]**  $2\frac{1}{2}$

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

वो

✓

$$g_A + g_B = 1$$

$$\frac{\pi}{40} + \frac{19\pi}{40} = \frac{\pi}{2} = 90^\circ$$

$$\frac{68\pi}{4} = \frac{1}{\sqrt{2}}$$

**212. The value of  $\cos^2 1^\circ + \cos^2 2^\circ + \cos^2 3^\circ + \dots + \cos^2 89^\circ = ?$**

$\cos^2 1^\circ + \cos^2 2^\circ + \cos^2 3^\circ + \dots + \cos^2 89^\circ$  का मान क्या है?

[A] 44

[B] 44.5

[C] 45

[D] 45.5

$$\cos^2 1^\circ + \cos^2 2^\circ + \cos^2 3^\circ + \dots + \cos^2 44^\circ + \cos^2 45^\circ + \cos^2 46^\circ + \dots + \cos^2 88^\circ + \cos^2 89^\circ$$

$$89 \text{ terms} = \frac{44 \text{ Pairs}}{88 \text{ terms}} + \cos^2 45^\circ = 44 + \frac{1}{2} = 44.5$$



213. The value of  $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \dots \dots \dots \sin^2 85^\circ + \sin^2 90^\circ$  is equal to:  
 $\sin^2 5^\circ + \sin^2 10^\circ + \sin^2 15^\circ + \dots \dots \dots \sin^2 85^\circ + \sin^2 90^\circ$  का मान  $\dots \dots \dots$  के बराबर है।

[A]  $9\frac{1}{2}$

[B] 9

[C]  $8\frac{1}{2}$

[D] 8

$$\underbrace{(\sin^2 5^\circ + \sin^2 10^\circ + \dots \dots \dots + \sin^2 80^\circ + \sin^2 85^\circ)}_{8.5} + \underbrace{\sin^2 90^\circ}_{+1}$$

$$17 \text{ terms} \rightarrow \overset{8 \text{ pairs}}{16 \text{ terms}} + \sin^2 45^\circ \\ = 8 + \frac{1}{2}$$



214. The value of/का मान है:

$$(\tan 29^\circ \cot 61^\circ - \operatorname{cosec}^2 61^\circ) + \cot^2 54^\circ - \sec^2 36^\circ + (\sin^2 1^\circ + \sin^2 3^\circ + \sin^2 5^\circ + \dots + \sin^2 89^\circ)$$

[A]  $22\frac{1}{2}$

[B] 21

[C]  $20\frac{1}{2}$

[D] 22

$$-1-1+(\sin^2 1^\circ + \sin^2 3^\circ + \sin^2 5^\circ + \dots + \sin^2 89^\circ)$$

$$= -2 + 22\frac{1}{2}$$

$$1, 3, 5, \dots, 89 \rightarrow 45 \text{ terms} = \cancel{44 \text{ terms}} + \sin^2 45^\circ = 44 + \frac{1}{2}$$

$$n = \frac{l-a}{d} + 1$$



215. The value of  $\frac{(\tan 25^\circ \cot 65^\circ - \operatorname{cosec}^2 65^\circ) + \cot^2 61^\circ - \sec^2 29^\circ}{\sin^2 5^\circ + \sin^2 7^\circ + \sin^2 9^\circ + \dots + \sin^2 85^\circ}$  is:

$(\tan 25^\circ \cot 65^\circ - \operatorname{cosec}^2 65^\circ) + \cot^2 61^\circ - \sec^2 29^\circ$  का मान ज्ञात करें।

[A]  $\frac{2}{45}$   
[C]  $\frac{-2}{41}$

[B]  $\frac{4}{45}$   
[D]  $\frac{-4}{41}$

$$\frac{-1-1}{\frac{41}{2}} = \frac{-4}{41}$$

$$\sin^2 5^\circ + \sin^2 7^\circ + \sin^2 9^\circ + \dots + \sin^2 83^\circ + \sin^2 85^\circ$$

$$\begin{aligned} &= 40 \cancel{\cos 45^\circ} + \sin^2 45^\circ \\ &= 40 + \frac{1}{2} \\ &= \frac{41}{2} \end{aligned}$$

$$\begin{aligned} n &= \frac{85-5}{2} + 1 \\ &= 41 \text{ terms} \end{aligned}$$



216. Find the value of  $\frac{\tan 1^\circ}{1+\tan 1^\circ} + \frac{\tan 2^\circ}{1+\tan 2^\circ} + \dots + \frac{\tan 89^\circ}{1+\tan 89^\circ}$ ? का मान ज्ञात कीजिए?

[A] 44.5 [B] 45  
[C] 44 [D] 89

89 terms =  $\frac{44 \text{ Pairs}}{88 \text{ terms}} + \frac{\tan 45^\circ}{1+\tan 45^\circ}$

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

$\frac{\tan 1^\circ}{1+\tan 1^\circ} + \frac{\tan 89^\circ}{1+\tan 89^\circ}$

$\frac{T}{1+T} + \frac{1}{T+1}$

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

$\tan 89^\circ = \frac{1}{\tan 1^\circ}$