# TRIGONOMETRY

# त्रिकोणमिति

## SHEET-02

# CLASS NOTES

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**If $\alpha + \beta = 90° \Rightarrow \alpha$ and $\beta$ are complimentary.**

**$\tan\alpha \times \tan\beta = 1$, $\cot\alpha \times \cot\beta = 1$, $\sin\alpha \times \sec\beta = 1$, $\cos\alpha \times \operatorname{cosec}\beta = 1$**

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

$\sin\alpha = \sin(90-\beta)$

$\Rightarrow \sin\alpha = \cos\beta$

$\Rightarrow \sin\alpha \cdot \frac{1}{\cos\beta} = 1$

$\Rightarrow \boxed{\sin\alpha \cdot \sec\beta = 1}$

$\boxed{\alpha + \beta = 90^\circ}$

- $\sin\alpha \cdot \sec\beta = 1$
- $\cos\alpha \cdot \operatorname{cosec}\beta = 1$
- $\tan\alpha \tan\beta = 1$
- $\cot\alpha \cdot \cot\beta = 1$

1. $2(\sin 1^\circ \times \sec 89^\circ) + 3(\cos 11^\circ \times \operatorname{cosec} 79^\circ) + 5(\tan 21^\circ \times \tan 69^\circ) = ?$

SSC CPO 04/10/2023 (Shift-02)

(a) 20 (b) 12

(c) 11 (d) 10

$2(1)+3\times1+5\times1$

$= 2+3+$

$= 10$

**2. The value of tan5° tan25° tan45° tan65° tan85° is equal to _____.**

tan5° tan25° tan45° tan65° tan85° का मान _____ के बराबर है।

**SSC CGL 24/07/2023 (Shift-2)**

(a) 4 (b) 3

(c) 1 (d) 2

$\tan 5^\circ \cdot \tan 85^\circ \cdot \tan 25^\circ \tan 65^\circ \cdot \tan 45^\circ$

$= 1 \times 1 \times 1$

$= 1$

**3. The value of cot 13° cot 27° cot 60° cot 63° cot 77° is:**

**cot 13° cot 27° cot 60° cot 63° cot 77° का मान है:**

**SSC CHSL 02/08/2023 Shift-02**

(a) $\frac{1}{\sqrt{3}}$ (b) 0

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

$(\cot 13 \cdot \cot 77)(\cot 27 \cdot \cot 63)\cot 60$

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

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

4. The value of $\frac{\sin 58^\circ}{\cos 32^\circ} + \frac{\sin 55^\circ \sec 35^\circ}{\tan 5^\circ \tan 45^\circ \tan 85^\circ}$ is equal to:

$\frac{\sin 58^\circ}{\cos 32^\circ} + \frac{\sin 55^\circ \sec 35^\circ}{\tan 5^\circ \tan 45^\circ \tan 85^\circ}$ का मान बराबर है:

**SSC CHSL 07/08/2023 Shift-04**

(a) 2
(b) 1
(c) 0
(d) 3

$\sin 58^\circ \cdot \sec 32^\circ + \frac{\sin 55^\circ \cdot \sec 35^\circ}{\tan 5^\circ \tan 45^\circ \tan 85^\circ}$

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

$= 2$

**5. Find the value of $\frac{\cos 37^\circ}{\sin 53^\circ} - \cos 47^\circ \operatorname{cosec} 43^\circ$.**

$\frac{\cos 37^\circ}{\sin 53^\circ} - \cos 47^\circ \operatorname{cosec} 43^\circ$ का मान ज्ञात कीजिए।

**SSC CPO 04/10/2023 (Shift-01)**

(a) –1 (b) 1

(c) 2 (d) 0

$\cos 37^\circ \cdot \operatorname{cosec} 53^\circ - \cos 47^\circ \cdot \operatorname{cosec} 43^\circ$

$= 1 - 1$

$= 0$

6. What is the value of $\frac{\cos 50^\circ}{\sin 40^\circ} + \frac{3\ \text{cosec}80^\circ}{\sec 10^\circ} - 2$ $\cos 50^\circ . \text{cosec}\ 40^\circ$?

$\frac{\cos 50^\circ}{\sin 40^\circ} + \frac{3\ \text{cosec}80^\circ}{\sec 10^\circ} - 2\cos 50^\circ . \text{cosec}\ 40^\circ$ का मान ज्ञात कीजिए।

SSC CGL MAINS (08/08/2022)

(a) 3 (b) 4

(c) 2 (d) 5

$\cos 50^\circ \text{cosec}\ 40^\circ + 3\text{cosec}\ 80^\circ \cos 10^\circ - 2\cos 50^\circ \text{cosec}\ 40^\circ$

$= 1 + 3 - 2$

$= 2$

7. The value of

$$\frac{\tan 13^\circ \tan 36^\circ \tan 45^\circ \tan 54^\circ \tan 77^\circ}{2\sec^2 60(\sin^2 60^\circ - 3\cos 60^\circ + 2)}$$ is:

$$= \frac{1}{2\times 4\left(\frac{3}{4} - 3\times\frac{1}{2} + \frac{2}{1}\right)}$$

$$= \frac{1}{2\,8\left(\frac{3-6+8}{4}\right)}$$

$$= \frac{1}{10}$$

$$\frac{\tan 13^\circ \tan 36^\circ \tan 45^\circ \tan 54^\circ \tan 77^\circ}{2\sec^2 60(\sin^2 60^\circ - 3\cos 60^\circ + 2)}$$ का मान ज्ञात करें।

**SSC CGL 20/08/2021 (Shift- 03)**

(a) $-\frac{1}{4}$

(b) $-\frac{1}{10}$

(c) $\frac{1}{10}$

(d) $\frac{1}{4}$

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

* $\sin\alpha = \sin(90 - \beta)$

$\Rightarrow \boxed{\sin\alpha = \cos\beta}$

* $\sin 10^\circ = \cos 80^\circ$

$\sin 20^\circ = \cos 70^\circ$

$\sin 40^\circ = \cos 50^\circ$

8. What is the value of $\frac{3\sin 58^\circ}{\cos 32^\circ} + \frac{3\sin 42^\circ}{\cos 48^\circ}$ ?

$\frac{3\sin 58^\circ}{\cos 32^\circ} + \frac{3\sin 42^\circ}{\cos 48^\circ}$ का मान ज्ञात कीजिए।

SSC CGL MAINS (08/08/2022)

(a) 9
(b) 6
(c) 7
(d) 8

$= 3\frac{\cos 32}{\cos 32} + 3\frac{\cos 48}{\cos 48}$

$= 6$

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

- $\sin A \sec B = 1$
- $\cos A \operatorname{cosec} B = 1$
- $\tan A \tan B = 1$
- $\cot A \cot B = 1$

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

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

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

$\Rightarrow \sin A = \cos B$

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

$\Rightarrow \tan A = \cot B$

Q.1 $\tan\alpha = \cot 40^\circ$

$\alpha = ?$

Ans $\alpha + 70 = 90$

$\alpha = 20^\circ$

Q. $\sin 30 = \cos x$

$2x = ?$

$30 + x = 90^\circ$

$x = 60^\circ$

$\therefore 2x = 120$

Q. $\sin x = \cos(x+20)$

$3x = ?$

$x + x + 20 = 90^\circ$

~~$2x = 70^\circ$~~ $35^\circ$

$\therefore 3x = 105$

9. If $\cos 2A = \sin 75°$, then the smallest positive value of A is:

यदि $\cos 2A = \sin 75°$ है, तो A का सबसे छोटा धनात्मक मान क्या होगा?

**SSC CHSL 27/05/2022 (Shift- 02)**

(a) 15°
(b) 7.5°
(c) 30°
(d) 37.5°

$2A + 75 = 90$

$2A = 15$

$A = 7.5$

**10. If $\cos(40^\circ + x) = \sin 30^\circ$, then the value of $x$ is :**

**ज्ञात कीजिए $\cos(40^\circ + x) = \sin 30^\circ$ तो $x$ का मान ___ है।**

**SSC CGL 25/07/2023 (Shift-04)**

**(a) 19°** **(b) 20°**

**(c) 23°** **(d) 22°**

$40 + x + 30 = 90^\circ$

$\Rightarrow 70 + x = 90$

$\Rightarrow x = 20^\circ$

**11. If $\tan 2\theta = \cot(\theta - 36^\circ)$, where $2\theta$ is an acute angle, then the value of $\theta$ is:**

**यदि $\tan 2\theta = \cot(\theta - 36^\circ)$, जहाँ $2\theta$ एक न्यून कोण है, तो $\theta$ का मान ज्ञात कीजिए।**

**SSC CHSL, 11/08/2023 (Shift-2)**

**(a) 18°** **(b) 36°**

**(c) 30°** **(d) 42°**

$2\theta + \theta - 36 = 90$

$3\theta = 126$

$\theta = 42^\circ$

$2\theta+54+\theta = 90^\circ$

$3\theta = 36^\circ$ $12^\circ$

$$\frac{1}{\cot 60^\circ + \sec 30^\circ}$$

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

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

**12.** **If $\cos(2\theta + 54°) = \sin\theta$, $0° < (2\theta + 54°) < 90°$, then what is the value of $\dfrac{1}{\cot 5\theta + \sec\dfrac{5\theta}{2}}$?**

यदि $\cos(2\theta + 54°) = \sin\theta$, $0° < (2\theta + 54°) < 90°$ है तो $\dfrac{1}{\cot 5\theta + \sec\dfrac{5\theta}{2}}$ का मान ज्ञात कीजिए।

**SSC CGL 20/08/2021 (Shift- 02)**

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

(b) $\frac{1}{3}$

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

(d) $2\sqrt{3}$

13. If $\sin(5x - 25°) = \cos(5y + 25°)$, where $5x - 25°$ and $5y + 25°$ are acute angles, then the value of $(x + y)$ is:

यदि $\sin(5x - 25°) = \cos(5y + 25°)$ है, जहाँ $5x - 25°$ और $5y + 25°$ न्यूनकोण है, तो $(x + y)$ का मान क्या होगा।

SSC CGL 18/07/2023 (Shift-03)

(a) 50°
(b) 40°
(c) ~~18°~~
(d) 16°

$5x - 25 + 5y + 25 = 90$

$\Rightarrow 5(x+y) = 90$ 18.

**14. If $\tan(5\theta - 10°) = \cot(5\varphi + 20°)$, then the value of $\theta + \varphi$ is :**

यदि $\tan(5\theta - 10°) = \cot(5\varphi + 20°)$ है, तो $\theta + \varphi$ का मान क्या है?

**SSC CHSL 10/08/2023 (Shift-2)**

(a) 16°
(b) 18°
(c) 15°
(d) 20°

$5\theta - 10 + 5\phi + 20 = 90°$

$\Rightarrow 5\theta + 5\phi = 80°$

$\Rightarrow 5(\theta + \phi) = 80°$ 16°

15. If $\sec(5\alpha-15°) = \operatorname{cosec}(15°-2\alpha)$, then the value of $\cos\alpha + \sin 2\alpha + \tan(1.5\alpha)$ is:

यदि $\sec(5\alpha-15°) = \operatorname{cosec}(15°-2\alpha)$ है तो $\cos\alpha + \sin 2\alpha + \tan(1.5\alpha)$ का मान ज्ञात कीजिए।

SSC CGL 20/08/2021 (Shift- 01)

(a) $\sqrt{2}+1$ (b) $\sqrt{2}-1$

(c) $\sqrt{3}-1$ (d) $\sqrt{3}+1$

$5\alpha - 15 + 15 - 2\alpha = 90°$

$\Rightarrow 3\alpha = 90° \quad 30°$

$\cos 30° + \sin 60° + \tan 45°$

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

$= \sqrt{3} + 1$

$\frac{45 \times 30}{15}$

16. If $\sin(20 + x)^\circ = \cos 60^\circ$, $0 \leq (20 + x) \leq 90$, then find the value of $2\sin^2(3x + 15)^\circ - \operatorname{cosec}^2(2x + 10)^\circ$.

H.W

यदि $\sin(20 + x)^\circ = \cos 60^\circ$, $0 \leq (20 + x) \leq 90$ है तो $2\sin^2(3x + 15)^\circ - \operatorname{cosec}^2(2x + 10)^\circ$ का मान ज्ञात कीजिए।

**SSC CGL 20/08/2021 (Shift- 01)**

(a) 3

(b) –3

(c) –2

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

$3A + A + 10 = 90^\circ$

$4A = 80^\circ$ ~~$20^\circ$~~

$2\,\text{cosec}\,30^\circ + 6\tan^2 60^\circ - \frac{3}{2}\tan^2 60^\circ$

$= 2 \times 2 + 6 \times 3 - \frac{3}{2} \times 3$

$= 4 + 18 - \frac{9}{2}$

$= 22 - \frac{9}{2} = \frac{35}{2}$

**17. If $\sin 3A = \cos(A + 10^\circ)$, where 3A is an acute angle then what is the value of $2\,\text{cosec}\frac{3A}{2} + 6\tan^2 3A - \frac{3}{2}\tan^2 3A$?**

यदि $\sin 3A = \cos(A + 10^\circ)$ जहां 3A न्यूनकोण है तो $2\,\text{cosec}\frac{3A}{2} + 6\tan^2 3A - \frac{3}{2}\tan^2 3A$ का मान ज्ञात कीजिए।

**SSC CGL 2019 Tier-II (15/10/2020)**

(a) $\frac{7}{4}$

(b) $\frac{35}{2}$

(c) $\frac{17}{2}$

(d) 5

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

$3\theta = 90^\circ$ $30^\circ$

18. If $\cos\theta = \sin(2\theta) \neq 0$, what is the value of $\cos^4\theta + \sin^4\theta + \cos^3\theta + \sin^3\theta + \sin^2\theta + \cos^2\theta + \sin\theta + \cos\theta$?

यदि $\cos\theta = \sin(2\theta) \neq 0$, तो $(\cos^4\theta + \sin^4\theta + \cos^3\theta + \sin^3\theta + \sin^2\theta + \cos^2\theta + \sin\theta + \cos\theta)$ का मान क्या?

**SSC Phase X 05/08/2022 (Shift- 03)**

(a) $\frac{18+8\sqrt{3}}{7}$

(b) $\frac{8+7\sqrt{3}}{18}$

(c) $\frac{7+18\sqrt{3}}{8}$

(d) $\frac{18+7\sqrt{3}}{8}$

$= \left(\frac{\sqrt{3}}{2}\right)^4 + \left(\frac{1}{2}\right)^4 + \left(\frac{\sqrt{3}}{2}\right)^3 + \left(\frac{1}{2}\right)^3 + 1 + \frac{1}{2} + \frac{\sqrt{3}}{2}$

$= \frac{9}{16} + \frac{1}{16} + \frac{3\sqrt{3}}{8} + \frac{1}{8} + \frac{1}{1} + \frac{1}{2} + \frac{\sqrt{3}}{2}$

$= \frac{9+1+6\sqrt{3}+2+16+8+8\sqrt{3}}{16}$

$= \frac{36+14\sqrt{3}}{16} = \frac{18+7\sqrt{3}}{8}$

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

If $\alpha + \beta = 90°$, then

$\sin^2\alpha + \sin^2\beta = 1$ &

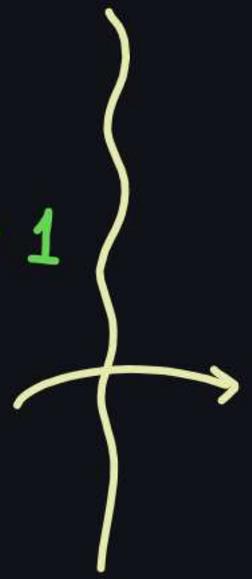
$\cos^2\alpha + \cos^2\beta = 1$

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

⊙ $\sin^2\alpha + \cos^2\alpha = 1$

$\Rightarrow$ $\sin^2\alpha + \cos^2(90-\beta) = 1$

$\Rightarrow$ $\sin^2\alpha + \sin^2\beta = 1$



$$\underline{\cos^2\alpha + \cos^2\beta = 1}$$

**19. Simplify the given expression.**

**दिए गए व्यंजक को सरल कीजिए।**

$$\frac{\sin^2 32^\circ + \sin^2 58^\circ}{\cos^2 32^\circ + \cos^2 58^\circ} + \sin^2 53^\circ + \cos 53^\circ \sin 37^\circ$$

$\sin 34^\circ$

$= \frac{1}{1} + \sin^2 53 + \sin^2 34$

$= 1 + 1$

$= 2$

**SSC CHSL 07/08/2023 Shift-04**

(a) 2
(b) −1
(c) −2
(d) 1

**20. The value of $\frac{5\cos^2 62^\circ + 5\cos^2 28^\circ - 21}{7\sin^2 35^\circ + 7\sin^2 55^\circ + 1}$ is:**

$\frac{5\cos^2 62^\circ + 5\cos^2 28^\circ - 21}{7\sin^2 35^\circ + 7\sin^2 55^\circ + 1}$ का मान ज्ञात कीजिए।

**SSC CGL 20/04/2022 (Shift- 03)**

(a) 3
(b) – 2
(c) 2
(d) – 3

$$\frac{5(\cos^2 62 + \cos^2 28) - 21}{7(\sin^2 35 + \sin^2 55) + 1} = \frac{5\times 1 - 21}{7\times 1 + 1} = -\frac{16}{8} = -2$$

**21. The value of** $\dfrac{\sqrt{2}\tan(60^\circ-\theta)\tan(30^\circ+\theta)}{\sin^2(45^\circ+\theta)+\sin^2(45^\circ-\theta)}$ **:**

$= \dfrac{\sqrt{2} \times 1}{1} = \sqrt{2}$

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

($45^\circ+\theta$ = x, $45^\circ-\theta$ = y)

SSC CGL 17/08/2021 (Shift- 02)

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

(b) 1

(c) 2

(d) $\sqrt{2}$

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

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

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

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

or

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

22. The value of $(\sin 37^\circ \cos 53^\circ + \cos 37^\circ \sin 53^\circ) - \frac{4\cos^2 37 - 7 + 4\cos^2 53^\circ}{\tan^2 47^\circ + 4 - \operatorname{cosec}^2 43^\circ}$ is:

$(\sin 37^\circ \cos 53^\circ + \cos 37^\circ \sin 53^\circ) - \frac{4\cos^2 37 - 7 + 4\cos^2 53^\circ}{\tan^2 47^\circ + 4 - \operatorname{cosec}^2 43^\circ}$ का मान ज्ञात कीजिए।

SSC CGL 18/08/2021 (Shift- 01)

(a) 1 (b) −2

(c) 0 (d) 2

$$\sin(34+53) - \left(\frac{4(\cos^2 34 + \cos^2 53) - 7}{\cot^2 43 - \operatorname{cosec}^2 43 + 4}\right)$$

$$= 1 - \left(\frac{4\times 1 - 7}{-1+4}\right)$$

$$= 1 - \left(-\frac{1}{3}\right)$$

$$= 1 + 1 = 2$$

$\sin(x+y) = \sin x \cos y + \cos x \sin y$

**23. The value of**

$$\frac{4\tan^2 30^\circ + \sin^2 30^\circ \cos^2 45^\circ + (\sec^2 48^\circ - \cot^2 42^\circ)}{\cos 37^\circ \sin 53^\circ + \sin 37^\circ \cos 53^\circ + \tan 18^\circ \tan 72^\circ}$$

का मान ज्ञात कीजिए।

$$= \frac{4\times\frac{1}{3} + \frac{1}{4}\times\frac{1}{2} + 1}{(\sin^2 53 + \sin^2 37) + 1}$$

$$= \frac{\frac{4}{3} + \frac{1}{8} + \frac{1}{1}}{1+1} = \frac{\frac{32+3+24}{24}}{2}$$

$$= \frac{59}{48}$$

**SSC CGL MAINS 29/01/2022**

(a) $\frac{35}{48}$

(b) $\frac{59}{48}$

(c) $\frac{49}{24}$

(d) $\frac{35}{24}$

**24. The value of $\frac{5\cos^2 62^\circ + 5\cos^2 28^\circ - 21}{7\sin^2 35^\circ + 7\sin^2 55^\circ + 1}$ is:**

$\frac{5\cos^2 62^\circ + 5\cos^2 28^\circ - 21}{7\sin^2 35^\circ + 7\sin^2 55^\circ + 1}$ का मान ज्ञात कीजिए।

**SSC CGL 20/04/2022 (Shift- 03)**

(a) 3 (b) – 2

(c) 2 (d) – 3

$$\frac{5(\cos^2 62 + \cos^2 28) - 21}{7(\sin^2 35 + \sin^2 55) + 1} = \frac{5\times 1 - 21}{7\times 1 + 1} = -\frac{16}{8} = -2$$

25. The value of

$$\frac{(\cos 9^\circ + \sin 81^\circ)(\sec 9^\circ + \operatorname{cosec} 81^\circ)}{\operatorname{cosec}^2 71^\circ + \cos^2 15^\circ - \tan^2 19^\circ + \cos^2 75^\circ}$$ is:

$$\frac{(\cos 9^\circ + \sin 81^\circ)(\sec 9^\circ + \operatorname{cosec} 81^\circ)}{\operatorname{cosec}^2 71^\circ + \cos^2 15^\circ - \tan^2 19^\circ + \cos^2 75^\circ}$$ का मान ज्ञात कीजिए।

**SSC CGL MAINS 03/02/2022**

(a) 1 (b) 4

(c) – 3 (d) 2

$$\frac{(\cos 9^\circ + \cos 9^\circ)(\sec 9^\circ + \sec 9^\circ)}{\operatorname{cosec}^2 41 - \cot^2 71 + \cos^2 15 + \cos^2 45}$$

$$= \frac{2\cos 9^\circ \times 2\sec 9^\circ}{1+1}$$

$$= \frac{4 \times \cos 9^\circ \times \frac{1}{\cos 9^\circ}}{2} = 2$$

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

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

$\tan^2 54 + 1 + 1 + 1$

$= \sec^2 54 + 2$

$= x^2 + 2$

**26.** If $x^2 = \sec^2 57°$, then $\cot^2 33° + \sin^2 57° + \sin^2 33° + \text{cosec}^2 57° \cos^2 33° + \sec^2 33° . \sin^2 57°$ is equal to :

यदि $x = \sec 57°$ है तो $\cot^2 33° + \sin^2 57° + \sin^2 33° + \text{cosec}^2 57° \cos^2 33° + \sec^2 33° . \sin^2 57°$ का मान ज्ञात कीजिए।

$1^2$ $1^2$

**SSC CGL TIER-II (16/10/2020)**

(a) $x^2 + 2$

(b) $2x^2 + 1$

(c) $x^2 + 1$

(d) $\dfrac{1}{x^2 + 1}$

$\sin^2 x \sec^2 y = 1^2$

$\cos^2 x \cdot \text{cosec}^2 y = 1^2$

$\tan x \cdot \tan y = 1$

$x + y = 90°$

$x + y = 90°$

" "

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

- $\sin(x+y) = \sin x \cos y + \cos x \sin y$
- $\sin(x-y) = \sin x \cos y - \cos x \sin y$
- $\cos(x+y) = \cos x \cos y - \sin x \sin y$
- $\cos(x-y) = \cos x \cos y + \sin x \sin y$

**27. Find the value of the following.**

निम्नलिखित का मान ज्ञात कीजिए।

$$\frac{\sin 67^\circ \cos 37^\circ - \sin 37^\circ \cos 67^\circ}{\cos 13^\circ \cos 17^\circ - \sin 13^\circ \sin 17^\circ}$$

$\frac{\sin(67-34)}{\cos(13+14)}$

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

**SSC CHSL 27/05/2022 (Shift-03)**

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

(b) $\frac{4}{\sqrt{3}}$

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

(d) 7

28. The value of $\frac{\sin^2 52^\circ + 2 + \sin^2 38^\circ}{4\cos^2 43^\circ - 5 + 4\cos^2 47^\circ}$ is:

$\frac{\sin^2 52^\circ + 2 + \sin^2 38^\circ}{4\cos^2 43^\circ - 5 + 4\cos^2 47^\circ}$ का मान ज्ञात करें।

SSC CPO 24/11/2020 (Shift-2)

(a) 3

(b) $\frac{1}{3}$

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

(d) -3

**29. 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।

**SSC CGL 2019 TIER-II (15/10/2020)**

(a) $-2$

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

(c) 2

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

$$= \frac{2(1)^2 + \sin^2 26 + \sin^2 64}{\tan^2 64 - \sec^2 64 + \cot^2 64 - \operatorname{cosec}^2 67}$$

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

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

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

**30. The value of**

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

Sec 64°

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

का मान ज्ञात कीजिए।

**SSC CGL MAINS 03/02/2022**

(a) 3 (b) 4

(c) −1 (d) −2

$$= \frac{3(\operatorname{cosec}^2 26^\circ - \cot^2 26^\circ) + (\cot^2 42^\circ - \operatorname{cosec}^2 42^\circ)}{\tan(68+\phi) - \tan(\phi+68) + \tan^2(28-\phi) - \sec^2(28-\phi)}$$

$$= \frac{3\times 1 + (-1)}{-1} = \frac{2}{-1} = -2$$

**31. The value of**

$$\frac{3(\cot^2 47^\circ - \sec^2 43^\circ) - 2(\tan^2 23^\circ - \operatorname{cosec}^2 67^\circ)}{\operatorname{cosec}^2(68^\circ + \theta) - \tan(\theta + 61^\circ) - \tan^2(22^\circ - \theta) + \cot(29^\circ - \theta)}$$

$$\frac{3(\cot^2 47^\circ - \sec^2 43^\circ) - 2(\tan^2 23^\circ - \operatorname{cosec}^2 67^\circ)}{\operatorname{cosec}^2(68^\circ + \theta) - \tan(\theta + 61^\circ) - \tan^2(22^\circ - \theta) + \cot(29^\circ - \theta)}$$

का मान ज्ञात कीजिए।

**SSC CGL MAINS 29/01/2022**

(a) 1 (b) 0

(c) 5 (d) -1

$$\frac{3(\tan^2 43 - \sec^2 43) - 2(\cot^2 64 - \operatorname{cosec}^2 67)}{\operatorname{cosec}^2(68+\theta) - \cot^2(68+\theta) - \tan(\theta+61) + \tan(61+\theta)}$$

$$= \frac{3(-1) - 2(-1)}{1+0} = \frac{-3+2}{1} = -1$$

**32. The value of/का मान बताइए।**

$$\frac{\sin 23^\circ \cos 67^\circ + \sec 52^\circ \sin 38^\circ + \cos 23^\circ \sin 67^\circ + \operatorname{cosec} 52^\circ \cos 38^\circ}{\operatorname{cosec}^2 20^\circ - \tan^2 70^\circ}$$

**SSC CGL 11/04/2022 (Shift- 01)**

(a) 3 (b) 4

(c) 2 (d) 0

$$= \frac{\cos^2 67 + 1 + \sin^2 67 + 1}{\sec^2 70 - \tan^2 70}$$

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