



SSC

SELECTION POST | CGL

TRIGONOMETRY

MATHEMATICS

2024-25 का निचोड़

Daily Live
3:00 pm

By - Shashi Si



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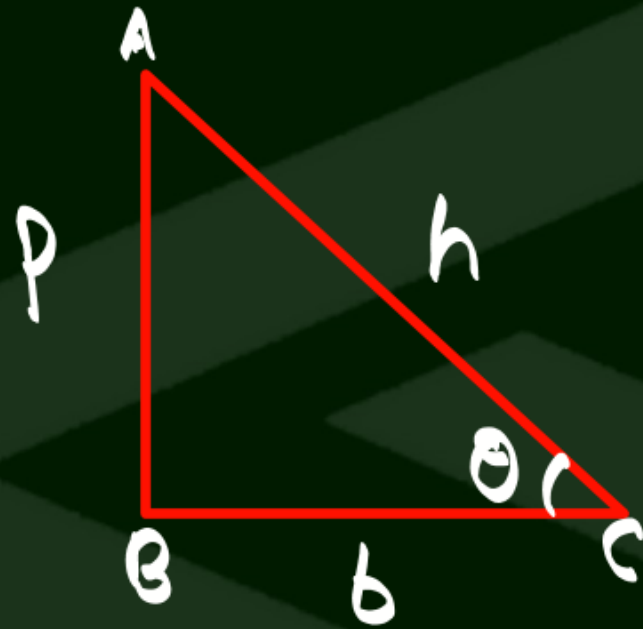
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TRIGONOMETRY (त्रिकोणमिति)

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

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

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



$$\begin{aligned}\sin \theta &= \frac{p}{h} \\ \cos \theta &= \frac{b}{h} \\ \tan \theta &= \frac{p}{b}\end{aligned}$$

$$\begin{aligned}\operatorname{cosec} \theta &= \frac{h}{p} \\ \sec \theta &= \frac{h}{b} \\ \cot \theta &= \frac{b}{p}\end{aligned}$$

Pythet

- * 3, 4, 5
- * 5, 12, 13
- * 7, 24, 25
- * 8, 15, 17
- * 9, 40, 41
- * 11, 60, 61
- * 12, 35, 37
- * 13, 84, 85

$$* \left[a^2 + b^2, 2ab, a^2 - b^2 \right]$$

- * 16, 63, 65
- * 20, 21, 29
- * 28, 45, 53
- * 39, 80, 89
- * 36, 77, 85
- * 33, 56, 65
- * 48, 55, 73
- * 65, 72, 97

$$* a^2 + 1, 2a, a^2 - 1$$

TRIGONOMETRIC FORMULAS

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

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

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

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

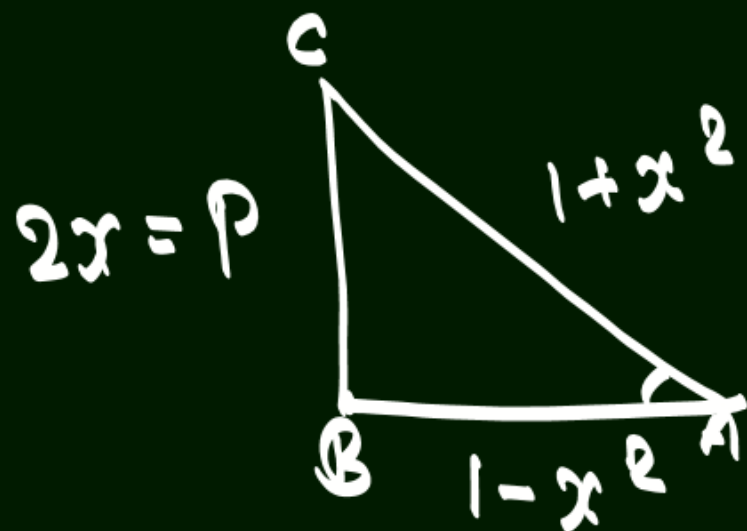
$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

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

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

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

$$\sin A = \frac{p}{h} = \frac{2x}{1+x^2}$$



1. If $\sin A = \frac{2x}{1+x^2}$ what is $\cos A$

यदि $\sin A = \frac{2x}{1+x^2}$ तो $\cos A$ क्या है?

(a) $\frac{1+x^2}{1-x^2}$

✓ (b) $\frac{1-x^2}{1+x^2}$

(c) $\frac{2x}{1-x^2}$

(d) $\frac{1-x^2}{2x}$

$$\frac{b}{h} = \frac{1-x^2}{1+x^2}$$

$$9 \sin^2 A + 16 \cos^2 A - 2 \times 3 \sin A \times 4 \cos A$$

$$+ 16 \sin^2 A + 9 \cos^2 A + 2 \times 3 \times 4 \times \cos A$$

$$25 \sin^2 A + 25 \cos^2 A$$

$$= 25 (\sin^2 A + \cos^2 A)$$

$$25 \times 1 = 25$$

2. If $\sin A = \frac{2}{3}$ find the value of $(3\sin A - 4\cos A)^2 + (4\sin A + 3\cos A)^2$.

2 यदि $\sin A = \frac{2}{3}$ $(3\sin A - 4\cos A)^2 + (4\sin A + 3\cos A)^2$ मान ज्ञात ज्ञात कीजिए.

SSC CGL 22 Sep 2025 Shift-II]

(a) 25

(b) 18

(c) 13

(d) 34

$$\sin A = \frac{2}{3}$$

$$\cos A = \frac{\sqrt{5}}{3}$$

$\sin x = \frac{3}{5} \Rightarrow \frac{3}{5}$

$\frac{1+\tan x}{1-\tan x} = \frac{1+\frac{3}{4}}{1-\frac{3}{4}} = \frac{7}{1}$

$\frac{1+\tan x}{1-\tan x} = 7$

3. If $\sin x = \frac{3}{5}$ and $x \in (0, \frac{\pi}{2})$, then find $\frac{1+\tan x}{1-\tan x}$.

यदि $\sin x = \frac{3}{5}$ और $x \in (0, \frac{\pi}{2})$ तो $\frac{1+\tan x}{1-\tan x}$ का मान ज्ञात कीजिए।

[SSC CGL 19 Sep 2025 Shift-1]

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

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

$$= \frac{3}{5} \times \frac{12}{13} + \frac{4}{5} \times \frac{5}{13}$$

$$\frac{36}{65} + \frac{20}{65} = \frac{56}{65}$$

4. If $\sin A = \frac{3}{5}$ and $\cos B = \frac{12}{13}$, A and $B \in (0, \frac{\pi}{2})$, find $\sin(A+B)$.

अगर $\sin A = \frac{3}{5}$ और $\cos B = \frac{12}{13}$ A and $B \in (0, \frac{\pi}{2})$, खोजो $\sin(A+B)$

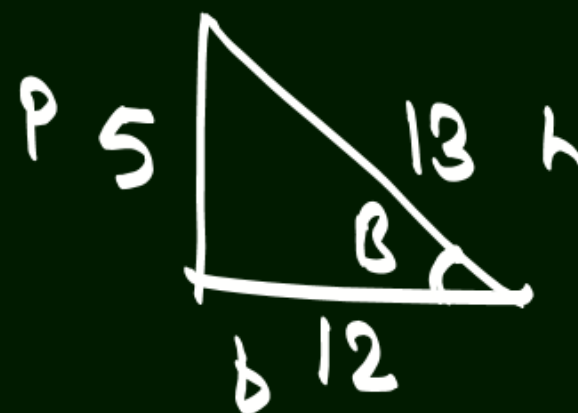
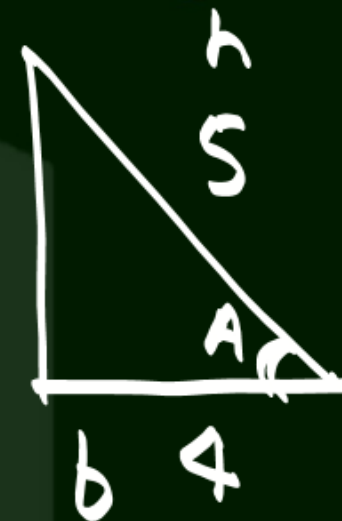
[SSC CGL 18 Sep 2025 Shift-II]

(a) $\frac{56}{65}$

(b) $\frac{63}{65}$

(c) $\frac{33}{65}$

(d) $\frac{77}{85}$



$$\tan A + \frac{1}{\tan A} = 4$$

$$\tan^2 A - 4 \tan A + 1 = 0$$

$$a = 1, b = -4, c = 1$$

$$\alpha = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{4 \pm \sqrt{16 - 4 \times 1 \times 1}}{2 \times 1}$$

$$= \frac{4 \pm 2\sqrt{3}}{2} = (2 \pm \sqrt{3})$$

5. If $\tan A + \cot A = 4$ and $\tan A \cdot \cot A = 1$, find $\tan^2 A + \sec^2 A$.

यदि $\tan A + \cot A = 4$ और $\tan A \cdot \cot A = 1$, तो ज्ञात कीजिए $\tan^2 A + \sec^2 A$.

[SSC CGL 18 Sep 2025 Shift-III]

(a) $14 + 8\sqrt{3}$

✓ (b) $15 + 8\sqrt{3}$

(c) $16 + 6\sqrt{2}$

(d) $13 + 4\sqrt{3}$

Sol $\Rightarrow \tan^2 A + 1 + \tan^2 A$

$$= 2 \tan^2 A + 1$$

$$= 2(2 \pm \sqrt{3})^2 + 1$$

$$= 2(7 \pm 4\sqrt{3}) + 1$$

$$= (14 \pm 1) + 8\sqrt{3} = 15 + 8\sqrt{3}$$

$$\sin A = \frac{4}{5} \quad b = 3$$

$$(1 + \tan A)(1 - \tan A)$$

$$= 1 - \tan^2 A = 1 - \left(-\frac{4}{3}\right)^2$$

$$= 1 - \frac{16}{9} = -\frac{7}{9}$$

6. If $\sin A = \frac{4}{5}$ and A lies in 2nd quadrant, find the value of $(1 + \tan A)(1 - \tan A)$.

यदि $\sin A = \frac{4}{5}$ और A दूसरे चतुर्थांश में स्थित है, तो $(1 + \tan A)$ ~~(1 - \tan A)~~ ज्ञात कीजिए.

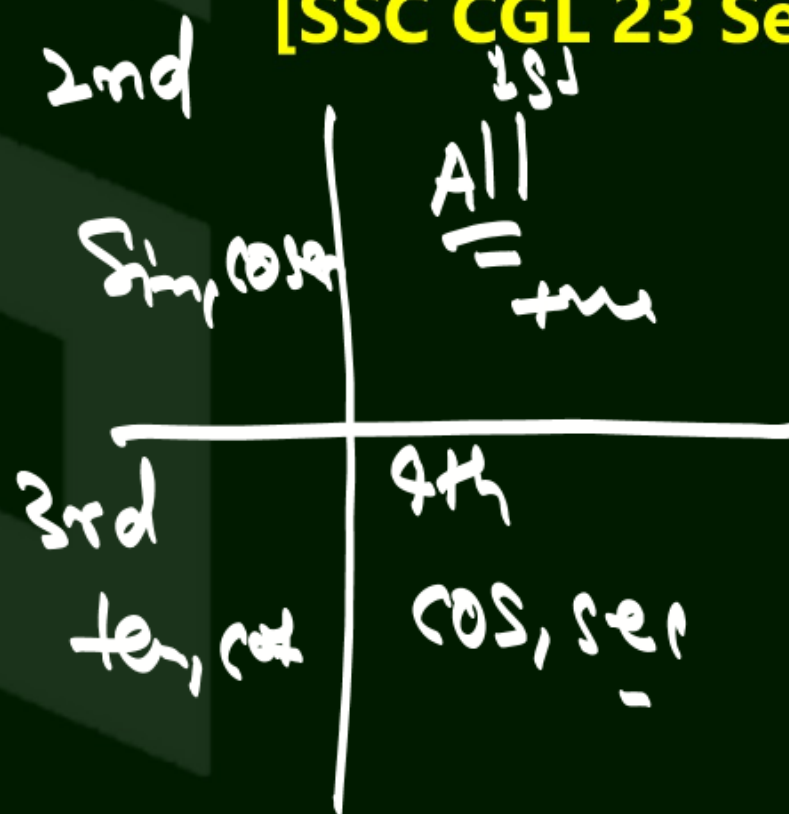
[SSC CGL 23 Sep 2025 Shift-II]

(a) $-\frac{9}{25}$

(b) $\frac{16}{25}$

(b) $\frac{1}{9}$

✓ (d) $-\frac{7}{9}$



$$\frac{\sin A + \cos A}{\sin A} = \sqrt{2} \frac{\sin A}{\sin A}$$

$$1 + \cot A = \sqrt{2}$$

$$\cot A = \sqrt{2} - 1$$

$$\tan A = \underline{\sqrt{2} + 1}$$

7. If $\sin A + \cos A = \sqrt{2} \sin A$, then what is the value of $\tan A$?

यदि $\sin A + \cos A = \sqrt{2} \sin A$ तो $\tan A$ का मान क्या है?

[SSC CGL 14 Sep 2025 Shift-III]

(a) $\sqrt{2}$

(b) 1

✓ (c) $\sqrt{2} + 1$

(d) $\sqrt{2} - 1$

8. If $\sin x + \cos x = \sqrt{2}$ what is the value of $\sin x - \cos x$?

$(a+b)^2 + (a-b)^2 = 2[a^2 + b^2]$ यदि $\sin x + \cos x = \sqrt{2}$ $\sin x - \cos x$ का मान क्या है?

[SSC CGL 19 Sep 2025 Shift-III]

(a) 0

(b) 1

(c) 2

(d) 3

$$(\sin x + \cos x)^2 + (\sin x - \cos x)^2 = 2[\sin^2 x + \cos^2 x]$$

$$(\sin x + \cos x)^2 + (\sin x - \cos x)^2 = 2$$

$$(\sqrt{2})^2 + (\sin x - \cos x)^2 = 2$$

$$(\sin x - \cos x)^2 = 0$$

$$\sin x - \cos x = 0$$

$$\sin x = \frac{6}{10} = \frac{3}{5} \quad b = 4$$

$$\sin 2x + \cos 2x = 2 \sin x \cdot \cos x + \cos^2 x - \sin^2 x$$

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

$$= 2 \times \frac{3}{5} \times \frac{4}{5} + \left(\frac{1}{5} - \frac{1}{5} \right)$$

$$\frac{24 + 1}{25} = \frac{25}{25} = 1.00$$

9. If $\sin x = 0.6$ and $x \in (0, \frac{\pi}{2})$, find $\sin 2x + \cos 2x$

यदि $\sin x = 0.6$ और $x \in (0, \frac{\pi}{2})$ है, तो $\sin 2x + \cos 2x$

ज्ञात कीजिए।

[SSC CGL 20 Sep 2025 Shift-I]

(a) 2.68

(b) 0.52

(c) 0.68

(d) 1.24

$$\sin A = \frac{3}{5}$$

$$\cos A = -\frac{4}{5}$$

$$(\sin A + \cos A)^2 =$$

$$\left(\frac{3}{5} - \frac{4}{5}\right)^2 = \left(-\frac{1}{5}\right)^2 = \frac{1}{25}$$

10. If $\sin A = \frac{3}{5}$ and A lies in the second quadrant, find the ~~and~~ value $(\sin A + \cos A)^2$
 $A = \frac{3}{5}$ और A दूसरे चतुर्थांश में स्थित है, $(\sin A + \cos A)^2$ का मान ज्ञात कीजिए.

[SSC CGL 17 Sep 2025 Shift-III]

(a) 0

(b) 1

(c) $\frac{1}{25}$

(d) $\frac{1}{5}$

$$\sin A = \cos B, A + B = 90^\circ$$

$$\cos A = \sin C, A + C = 90^\circ$$

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

$$C = 90^\circ - A$$

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

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

$$A = 90^\circ$$

11. If $\sin(A) = \cos(B)$ $\cos(A) = \sin(C)$ and $A + B + C = 90^\circ$ then what is the value of angle A?

यदि $\sin(A) = \cos(B)$, $\cos(A) = \sin(C)$ तथा $A + B + C = 90^\circ$ तो कोण A का मान क्या है?

[SSC CGL 21 Sep 2025 Shift-III]

☒ (a) 90°

(b) 60°

(c) 30°

(d) 15°

12. If $\sin A = \frac{2x}{1+x^2}$ what is $\cos A$?

$\sin A = \frac{2x}{1+x^2}$, $\cos A$ क्या है?

[SSC CGL 18 Sep 2025 Shift-III]

H.W

(a) $\frac{1+x^2}{1-x^2}$

(b) $\frac{1-x^2}{1+x^2}$

(c) $\frac{x^2}{1-x^2}$

(d) $\frac{1-x^2}{x^2}$

$$\cot A = x + \frac{1}{x}, \quad \operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$= 1 + \left[x + \frac{1}{x} \right]^2 = 1 + x^2 + \frac{1}{x^2} + 2$$

$$= 3 + x^2 + \frac{1}{x^2}$$

13. If $\cot A = x + \frac{1}{x}$ find $\operatorname{cosec}^2 A$.

यदि $\cot A = x + \frac{1}{x}$ तो $\operatorname{cosec}^2 A$ ज्ञात कीजिए.

[SSC CGL 17 Sep 2025 Shift-III]

(a) $x^2 + \frac{1}{x^2} + 1$

(b) $x^2 + \frac{1}{x^2} + 2$

✓ (c) $x^2 + \frac{1}{x^2} + 3$

(d) $x^2 + \frac{1}{x^2} + 4$

$$\cot A = \sqrt{3} = \cot 30^\circ$$

$$A = 30^\circ$$

$$\text{Sol-: } (1 + \sin 30^\circ)(1 + \cos 30^\circ)$$

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

$$\frac{3}{2} \times \frac{(2 + \sqrt{3})}{2} = \frac{6 + 3\sqrt{3}}{4}$$

14. If $\cot A = \sqrt{3}$ what is the value of $(1 + \sin A)(1 + \cos A)$?

यदि $\cot A = \sqrt{3}$ तो $(1 + \sin A)(1 + \cos A)$ का मान क्या है?

[SSC CGL 19 Sep 2025 Shift-III]

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

☒ (b) $\frac{6 + 3\sqrt{3}}{4}$

(c) $\frac{7 + 3\sqrt{3}}{4}$

(d) $\frac{11 + 3\sqrt{3}}{5}$

15. If $\sec(A) + \tan A = 5/2$ then what is $\sec A - \tan A$?

यदि $\sec A + \tan A = 5/2$ हो, तो $\sec A - \tan A$ का मान क्या होगा?

[SSC CGL 21 Sep 2025 Shift-II]

- ✓ (a) $2/5$
- (b) $5/2$
- (c) $1/2$
- (d) $1/5$

$$\begin{aligned} S^2 - t^2 &= 1 \\ (S+t)(S-t) &= 1 \\ x(S-t) &= 1 \\ S-t &= 1/x \end{aligned}$$

16. If $\tan A + \sec(A) = 3$ find $\tan A$.

यदि $\tan A + \sec A = 3$ तो $\tan A$ ज्ञात कीजिए।

[SSC CGL 2025]

$$T + S = 3$$

$$S - T = \frac{1}{3}$$

$$\hline 2S = \frac{10}{3}$$

$$S = \frac{10}{3 \times 2} = \frac{5}{3}$$

$$T = 3 - \frac{5}{3} = \frac{4}{3}$$

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

✓ (b) $\frac{4}{3}$

(c) $\frac{5}{4}$

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

$$T + S = 3$$

$$\hline S - T = \frac{1}{3}$$

$$2T = \frac{8}{3}$$

$$T = \frac{4}{3}$$

$$\begin{aligned}\sin x &= \cos y \\ x + y &= 90^\circ \\ \cos x &= \sin y \\ x + y &= 90^\circ\end{aligned}$$

17. If $\sin x = \cos y$ and $\cos x = \sin y$, then $x + y$ equals:
यदि $\sin x = \cos y$ और $\cos x = \sin y$, तो $x + y$ बराबर है:
[SSC CGL 2025]

- (a) 45°
- (b) 60°
- ✓ (c) 90°
- (d) 180°

$$\begin{aligned}
 3x + 10 + 2x - 5 &= 90^\circ \\
 5x + 5 &= 90^\circ \\
 5x &= 85^\circ \\
 x &= 17^\circ
 \end{aligned}$$

18. If $\sin(3x + 10^\circ) = \cos(2x - 5^\circ)$ find x .

यदि $\sin(3x + 10^\circ) = \cos(2x - 5^\circ)$ हो तो x ज्ञात कीजिए।

[SSC CGL 20 Sep 2025 Shift-I]

- (a) 27°
- (b) 30°
- (c) 25°
- (d) 17°

$$\theta_1 + \theta_2 = 90^\circ$$

$$\begin{aligned} \sin^2 A + \cos^2 A &= 1 \\ \sin^2 A &= 1 - \cos^2 A \end{aligned} \quad \left| \quad \begin{aligned} \sin^2 A - \cos^2 A &= \frac{1}{2} \\ (1 - \cos^2 A - \cos^2 A) &= \frac{1}{2} \end{aligned} \right.$$

$$1 - 2\cos^2 A = \frac{1}{2}$$

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

$$\cos^2 A = \frac{1}{4}$$

19. If $\sin^2 A - \cos^2 A = 1/2$ find the value of $\cos^2 A$.
 यदि $\sin^2 A - \cos^2 A = 1/2$ तो $\cos^2 A$ का मान ज्ञात कीजिए।

[SSC CGL 18 Sep 2025 Shift-

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

✓ (b) $\frac{1}{4}$

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

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

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

$$\sin A = \cos B = \frac{3}{5}$$

b
h
p = 4

$$\tan B = \frac{4}{3}$$

20. Given, A and B are complementary angles, and $\sin A = \frac{3}{5}$ what is $\tan B$?

दिया गया है कि A और B पूरक कोण हैं, और $\sin A = \frac{3}{5}$ तो $\tan B$ क्या है?

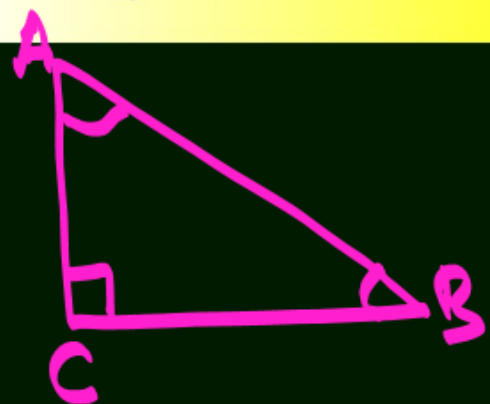
(a) $\frac{4}{3}$

(c) $\frac{5}{4}$

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

(d) $\frac{5}{3}$

[SSC CGL 13 Sep 2025 Shift-1]



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

$$\sin A = \cos B = \frac{5}{13}$$

$$\cos B = \frac{5}{13}$$

21. In $\triangle ABC$, right-angled at C, if $\sin A = \frac{5}{13}$ then $\cos B$ = ?

$\triangle ABC$ में, C समकोण है, यदि $\sin A = \frac{5}{13}$ तो $\cos B = ?$

SSC CGL 26 Sep 2025]

(a) $\frac{5}{13}$

(b) $\frac{2}{13}$

(c) $\frac{7}{13}$

(d) $\frac{9}{13}$

22. If $\sin A + \cos A = 1$ then find the value of $\sin^4 A + \cos^4 A$.

यदि $\sin A + \cos A = 1$, $\sin^4 A + \cos^4 A$ का मान ज्ञात कीजिए।

[SSC CGL 21 Sep 2025 Shift-1]

- (a) 1
- (b) $\frac{1}{2}$
- (c) $\frac{3}{4}$
- (d) $\frac{5}{8}$

$$\begin{aligned} (\sin A + \cos A)^2 &= 1^2 \\ \sin^2 A + \cos^2 A + 2 \sin A \cos A &= 1 \\ 1 + 2 \sin A \cos A &= 1 \\ 2 \sin A \cos A &= 0 \\ \sin A \cos A &= 0 \end{aligned}$$

$$\begin{aligned} (\sin^2 A + \cos^2 A)^2 &= (1)^2 \\ \sin^4 A + \cos^4 A + 2 \sin^2 A \cos^2 A &= 1 \\ \sin^4 A + \cos^4 A &= (1 - 2 \sin^2 A \cos^2 A) \\ &= 1 - 2 \times 0 = 1 \end{aligned}$$

$$(5+t)(5-t) = 1$$

$$x(5-t) = 1$$

$$5-t = \frac{1}{x}$$

23. If $\tan A + \sec(A) = 5$ then what is the value of $\tan A$?

यदि $\tan A + \sec(A) = 5$ है, तो $\tan A$ का मान क्या है?

[SSC CGL 25 Sep 2025]

(a) $\frac{5}{2}$

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

(b) $\frac{12}{5}$

(d) $\frac{4}{5}$

$$\frac{5+t}{5-t} = \frac{1}{x}$$

$$2t = \frac{24}{5}$$

$$t = \frac{12}{5}$$

24. If $\sec A + \tan A = p$, then what is $\sec A$ in terms of p ?

यदि $\sec A + \tan A = p$, तो p के संदर्भ में $\sec A$ क्या है?

SSC CGL 23 Sep 2025 Shift-I]

H.W

(a) $\frac{p^2 + 1}{2p}$

(b) $\frac{p^2 + 1}{3p}$

(c) $\frac{p^2 + 1}{5p}$

(d) $\frac{p^2 + 1}{9p}$

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