

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

$$(\sin^2 \theta + \cos^2 \theta = 1) \div \cos^2 \theta$$

$\cos^2 \theta$ से भाग देने पर

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

$$\tan^2 \theta = \sec^2 \theta - 1 \longrightarrow \tan^2 \theta = (\sec \theta - 1)(\sec \theta + 1)$$

$$\frac{\tan \theta}{(\sec \theta + 1)} = \frac{(\sec \theta - 1)}{\tan \theta}$$

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

$$(\sec \theta - \tan \theta)(\sec \theta + \tan \theta) = 1$$

$$(\sec \theta - \tan \theta) = \frac{1}{(\sec \theta + \tan \theta)}$$

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

$$(\sin^2 \theta + \cos^2 \theta = 1) \div \sin^2 \theta$$

$\sin^2 \theta$ से भाग देने पर

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

$$\cot^2 \theta = \operatorname{cosec}^2 \theta - 1 \longrightarrow \cot^2 \theta = (\operatorname{cosec} \theta - 1)(\operatorname{cosec} \theta + 1)$$

$$\frac{\cot \theta}{(\operatorname{cosec} \theta + 1)} = \frac{(\operatorname{cosec} \theta - 1)}{\cot \theta}$$

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

$$(\operatorname{cosec} \theta + \cot \theta)(\operatorname{cosec} \theta - \cot \theta) = 1$$

$$(\operatorname{cosec} \theta - \cot \theta) = \frac{1}{(\operatorname{cosec} \theta + \cot \theta)}$$

$$\text{If, } \operatorname{cosec} \theta + \cot \theta = \frac{7}{3}$$

$$\operatorname{cosec} \theta - \cot \theta = \frac{3}{7}$$



50. If $\sec A + \tan A = 5$, then $\sec A - \tan A = ?$

यदि $\sec A + \tan A = 5$, तो $\sec A - \tan A = ?$

[A] $5/2$

[C] 5

☒ [B] $1/5$

[D] $2/5$

51. If $\sec \theta + \tan \theta = 4 + \sqrt{15}$, then find the value of $\sec \theta - \tan \theta$.
यदि $\sec \theta + \tan \theta = 4 + \sqrt{15}$ है, तो $\sec \theta - \tan \theta$ का मान ज्ञात कीजिए।
(RRB GROUP-D 2025)

[A] $4\sqrt{15}$

[B] 15

☒ [C] $4 - \sqrt{15}$

[D] 10

$$= \frac{1}{4 + \sqrt{15}} \times \frac{4 - \sqrt{15}}{4 - \sqrt{15}}$$

$$= \frac{4 - \sqrt{15}}{1}$$

$$16 - 15$$

52. If $\frac{1-\cos\theta}{\sin\theta} = \frac{2}{7}$, then what will be the value of $\frac{1+\cos\theta}{\sin\theta}$?

यदि $\frac{1-\cos\theta}{\sin\theta} = \frac{2}{7}$, तो $\frac{1+\cos\theta}{\sin\theta}$ का मान क्या होगा?

[A] 5

[B] $\frac{2}{7}$

[C] 3.5

[D] $\frac{1}{5}$

$$\cancel{6800} - 670 = \frac{2}{7}$$

$$\cancel{6800} + 670 = \frac{7}{2} = 3.5$$

53. If $\sec x + \tan x = 5$ and $\operatorname{cosec} y - \cot y = 1/3$, then find the value of $(\sec x + \operatorname{cosec} y) - (\tan x - \cot y)$.

यदि $\sec x + \tan x = 5$ और $\operatorname{cosec} y - \cot y = 1/3$, तो $(\sec x + \operatorname{cosec} y) - (\tan x - \cot y)$ का मान ज्ञात कीजिए।

SSC CHSL TIER - I 2022

[A] 2.2

[C] 4.2

[B] 3.2

[D] 3.1

$$(\sec x - \tan x) + (\operatorname{cosec} y + \cot y)$$

$$\downarrow \quad \quad \downarrow$$
$$\frac{1}{5} + 3$$

$$= 0.2 + 3$$

54. If $\sec \beta + \tan \beta = 5$, then what is the value of $\sin \beta$?

यदि $\sec \beta + \tan \beta = 5$, तो $\sin \beta$ का मान क्या है?

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[A] 5/13

[C] 3/5

[B] 12/13

[D] 4/5

$$\sec \beta + \tan \beta = 5$$

$$\sec \beta - \tan \beta = \frac{1}{5}$$

add

$$2\sec \beta = 5 + \frac{1}{5}$$

$$\sec \beta = \frac{13}{5}$$

$$\sec \beta = \frac{13}{5} \rightarrow H$$

$$12 \rightarrow P$$

55. If $P = \tan\theta + \sec\theta$, then the value of $\tan\theta$ is:

यदि $P = \tan\theta + \sec\theta$ है, तो $\tan\theta$ का मान ज्ञात करें।

[A] $\frac{P^2+1}{2P}$

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

[C] $\frac{P^2-1}{P+1}$

☒ [D] $\frac{P^2-1}{2P}$

दिया है $\sec\theta + \tan\theta = P$

$\sec\theta - \tan\theta = \frac{1}{P}$

$\tan\theta = \frac{P^2-1}{2P}$

वै $\tan\theta = P - \frac{1}{P}$

56. If $1 + \sin\theta = m\cos\theta$, then what is the value of $\sin\theta$?

यदि $1 + \sin\theta = m\cos\theta$ है, तो $\sin\theta$ का मान क्या होगा?

(SSC CGL 2022)

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

[C] $\frac{m^2+1}{2m^2-1}$

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

[D] $\frac{2m^2-1}{m^2-1}$

$\frac{1 + \sin\theta}{\cos\theta} = m$

$\sec\theta = \frac{m^2+1}{2m} \rightarrow H$
 $2m \rightarrow B$
 $m^2-1 = P$

$\sec\theta + \tan\theta = m$

$\sec\theta - \tan\theta = \frac{1}{m}$

$2\sec\theta = m + \frac{1}{m}$

a^2-b^2
 $2ab$
 a^2+b^2

57. If $\sec\theta - \tan\theta = \frac{x}{y}$, ($0 < x < y$) and ($0^\circ < \theta < 90^\circ$), then $\sin\theta$ is equal to:-

यदि $\sec\theta - \tan\theta = \frac{x}{y}$, ($0 < x < y$) और $0^\circ < \theta < 90^\circ$ है, तो $\sin\theta$ का मान ज्ञात कीजिए:

[A] ~~$\frac{x^2 + y^2}{2xy}$~~

[B] ~~$\frac{2xy}{x^2 + y^2}$~~

[C] $\frac{y^2 - x^2}{x^2 + y^2}$

[D] ~~$\frac{x^2 + y^2}{y^2 - x^2}$~~

$$\sec\theta = \frac{x^2 + y^2}{2xy} \rightarrow H \rightarrow B$$

add

$$\sec\theta - \tan\theta = \frac{x}{y}$$

$$\sec\theta + \tan\theta = \frac{y}{x}$$

$$2\sec\theta = \frac{x}{y} + \frac{y}{x}$$

$$y^2 - x^2 = p$$

58. If $\sec\theta + \tan\theta = \sqrt{21 + \sqrt{21 - \sqrt{21 + \sqrt{21 - \dots \infty}}}}$ then $\sin\theta + \cos\theta = ?$

यदि $\sec\theta + \tan\theta = \sqrt{21 + \sqrt{21 - \sqrt{21 + \sqrt{21 - \dots \infty}}}}$ तो $\sin\theta + \cos\theta = ?$

[A] 17/13

[B] 17/21

[C] 13/21

[D] 21/13

$$\sec\theta + \tan\theta = 5$$

$$\sqrt{a + \sqrt{a - \sqrt{a + \sqrt{a - \dots \infty}}}} = \frac{\sqrt{4a-3} + 1}{2}$$

$$\frac{\sqrt{81} + 1}{2}$$

59. If $\sec\theta + \tan\theta = s$, then find the value of $\frac{s^2-1}{s^2+1}$.

यदि $\sec\theta + \tan\theta = s$ है, तो $\frac{s^2-1}{s^2+1}$ का मान ज्ञात कीजिए।

(RRB NTPC 12th LEVEL 2025)

[A] cosec θ

[B] sec θ

✓ [B] sin θ

[D] cot θ

$$\frac{s - \frac{1}{s}}{s + \frac{1}{s}} = \frac{\cancel{2s} - \cancel{1}}{\cancel{2s} + \cancel{1}} = \sin\theta$$

$$\sec\theta + \tan\theta = s$$

$$\sec\theta - \tan\theta = \frac{1}{s}$$

$$\frac{s}{\cancel{\text{Excess}}}$$

60. If $\operatorname{cosec}\theta - \cot\theta = m$, then what is $\operatorname{cosec}\theta$ equal to?

यदि $\operatorname{cosec}\theta - \cot\theta = m$ है तो $\operatorname{cosec}\theta$ किसके बराबर होगा ?

[A] $m + \frac{1}{m}$

[B] $m - \frac{1}{m}$

[C] $\frac{m}{2} + \frac{2}{m}$

☒ [D] $\frac{m}{2} + \frac{1}{2m}$

~~$\operatorname{cosec}\theta - \cot\theta = m$~~

~~$\operatorname{cosec}\theta + \cot\theta = \frac{1}{m}$~~

add

$$\operatorname{cosec}\theta = \frac{m + \frac{1}{m}}{2}$$

61. If $\operatorname{cosec}\theta - \cot\theta = \frac{1}{11}$, and θ lies in the first quadrant, then find the value of $122 \cos\theta$.

यदि $\operatorname{cosec}\theta - \cot\theta = \frac{1}{11}$ है, और θ प्रथम चतुर्थांश में स्थित है, तो $122 \cos\theta$ का मान ज्ञात कीजिए।

(RRB GROUP-D 2025)

[A] 164

[C] 231

[B] 120

[D] 214

$$\frac{122 \times 60}{61}$$

$$\operatorname{cosec}\theta - \cot\theta = \frac{1}{11}$$

$$\begin{array}{r} \operatorname{cosec}\theta + \cot\theta = 11 \\ \hline 2\operatorname{cosec}\theta = \frac{122}{11} \end{array}$$

$$\begin{array}{l} \operatorname{cosec}\theta = \frac{61}{11} \rightarrow H \\ \phantom{\operatorname{cosec}\theta} \rightarrow P \\ 60 \rightarrow B \end{array}$$

62. If $\operatorname{cosec}\theta - \cot\theta = \frac{7}{2}$, then value of $\sin\theta = ?$

यदि $\operatorname{cosec}\theta - \cot\theta = \frac{7}{2}$, तो $\sin\theta$ का मान = ?

[A] $\frac{47}{28}$

[C] $\frac{28}{53}$

[B] $\frac{28}{51}$

[D] $\frac{28}{49}$

$$\sec\theta + \tan\theta = k \text{ (माना)}$$

$$\sec\theta - \tan\theta = \frac{1}{k}$$

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

$$k = 2x, \frac{1}{2x}$$

$$\sqrt{\frac{1+S}{1-S} \times \frac{1+S}{1-S}} = \frac{1+S}{C} = \sec\theta + \tan\theta$$

$$= k$$

63. If $\sec\theta = x + \frac{1}{4x}$ then $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = ?$

यदि $\sec\theta = x + \frac{1}{4x}$ तो $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = ?$

[A] $2x, -\frac{1}{2x}$

[C] $2x$

☒ [B] $2x, \frac{1}{2x}$

[D] $\frac{1}{2x}$


$$\text{if, } x + \frac{1}{x} = c + \frac{1}{c}$$

$$\text{तो } x = c, \frac{1}{c}$$




64. Let $\frac{(1 + \sin\theta)}{\cos\theta} = P + \sqrt{p^2 + 1}$. What is $\sec\theta$ equal to?

मान लीजिए $\frac{(1 + \sin\theta)}{\cos\theta} = P + \sqrt{p^2 + 1}$, $\sec\theta$ का मान क्या है?

(UPSC CDS - II 2025)

[A] p

[C] $\frac{1}{\sqrt{p^2 + 1}}$

~~[B]~~

[D]

$\sqrt{p^2 + 1}$
 $\frac{p}{\sqrt{p^2 + 1}}$

$$\sec\theta + \tan\theta = p + \sqrt{p^2 + 1}$$

$$\sec\theta = \sqrt{\tan^2\theta + 1}$$
$$= \sqrt{p^2 + 1}$$

★ ★ # यदि $a \sec \theta + b \tan \theta = c$

तो $a \tan \theta + b \sec \theta = x$ (माना)

$a \sec \theta - b \tan \theta = c$

तो $a \tan \theta - b \sec \theta = x$ (माना)

square then subtract

$$a^2 - b^2 = c^2 - x^2$$

$$x^2 = c^2 - a^2 + b^2$$

$$x = \pm \sqrt{c^2 - a^2 + b^2}$$

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



65. If $a \sec A + b \tan A = c$, then $a \tan A + b \sec A$ is equal to:

यदि $a \sec A + b \tan A = c$ है, तो $a \tan A + b \sec A$ का मान क्या है?

[A] $\pm \sqrt{c^2 - b^2 + a^2}$

[B] $\pm \sqrt{a^2 + b^2 - c^2}$

[C] $\pm \sqrt{a^2 + b^2 + c^2}$

~~[D] $\pm \sqrt{c^2 - a^2 + b^2}$~~

66. If $5\sec\theta - 6\tan\theta = 7$ then $5\tan\theta - 6\sec\theta = ?$

यदि $5\sec\theta - 6\tan\theta = 7$ तो $5\tan\theta - 6\sec\theta = ?$

☒ [A] $\pm 2\sqrt{15}$

[B] ± 7

[C] $\pm \sqrt{38}$

[D] None

$$5^2 - 6^2 = 7^2 - ?^2$$

$$?^2 = 49 + 11$$

$$?^2 = 60$$

$$? = \pm 2\sqrt{15}$$

67. If $29 \sec\theta - 21 \tan\theta = 20$ then $29 \tan\theta - 21 \sec\theta = ?$

यदि $29 \sec\theta - 21 \tan\theta = 20$ तो $29 \tan\theta - 21 \sec\theta = ?$

[A] 0

[B] 29

[C] 21

[D] 20

$$\cancel{29^2 - 21^2 = 20^2 - ?^2}$$

$$? = 0$$

$$20^2 + 21^2 = 29^2$$

68. $5\sec\theta - 4\tan\theta = 3\operatorname{cosec}\theta$, then find the value of $\frac{27\cot\theta}{5\tan\theta - 4\sec\theta} = ?$

$5\sec\theta - 4\tan\theta = 3\operatorname{cosec}\theta$, तो $\frac{27\cot\theta}{5\tan\theta - 4\sec\theta}$ का मान ज्ञात कीजिए।

[A] 5

[B] 9

[C] 7

[D] 6

$$= \frac{\cancel{27\cot\theta}}{\cancel{3\cot\theta}}$$

$$5\sec\theta - 4\tan\theta = 3\operatorname{cosec}\theta$$

$$5\tan\theta - 4\sec\theta = ?$$

$$? = 3\cot\theta$$

$$5^2 - 4^2 = (3\cot\theta)^2 - ?^2$$

$$?^2 = 9\cot^2\theta - 9$$

$$?^2 = 9\cot^2\theta$$