

Example

If, $\frac{a+b}{a-b} = \frac{11}{4}$

तो $\frac{a}{b} = \frac{11+4}{11-4} = \frac{15}{7}$

यदि $\frac{a+b}{a-b} = \frac{x}{y}$ तो $\frac{a}{b} = \frac{x+y}{x-y}$



52. If $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = 12$, then the value of $\frac{12\tan^2\theta - 3}{169\cot^2\theta + 1}$ is:

यदि $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = 12$ है, तो $\frac{12\tan^2\theta - 3}{169\cot^2\theta + 1}$ का मान ज्ञात कीजिए।

RRB NTPC GRADUATE LEVEL CBT-1 2024

RRB TECHNICIAN GRADE-3 2025

[A] ~~$-\frac{83}{21}$~~
[C] ~~$-\frac{83}{61}$~~

[B] ~~$\frac{83}{21}$~~
[D] $\frac{83}{61}$

$$\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = 12$$

$$\Rightarrow \frac{\sin\theta}{\cos\theta} = \frac{12+1}{12-1}$$

$$\tan\theta = \frac{13}{11} \Rightarrow \cot\theta = \frac{11}{13}$$

$$\frac{169-3}{121+1} = \frac{166}{122}$$

53. If $\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = 5\frac{3}{13}$, then the value of $\sin\theta$ is:

यदि $\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = 5\frac{3}{13}$ है, तो $\sin\theta$ का मान ज्ञात कीजिए।

RRB GROUP-D 2026, RRB TECHNICIAN GRADE-3 2025

[A] $\frac{45}{81}$

$5 + \frac{3}{13}$

[B] $\frac{23}{81}$

[C] $\frac{55}{81}$

[D] $\frac{29}{81}$

$$\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = \frac{68}{13}$$

$$\Rightarrow \frac{\sec\theta}{\tan\theta} = \frac{68+13}{68-13}$$

$$\frac{1}{\sin\theta} = \frac{81}{55}$$

सि/सि

54. If $\frac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta} = \frac{3}{5}$, then the value of $\frac{\operatorname{cosec}\theta + \cot\theta}{\operatorname{cosec}\theta - \cot\theta}$ is: —

यदि $\frac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta} = \frac{3}{5}$ है, तो $\frac{\operatorname{cosec}\theta + \cot\theta}{\operatorname{cosec}\theta - \cot\theta}$ का मान बताइए।

[A] $31 + 8\sqrt{15}$

[B] $33 + 4\sqrt{15}$

[C] $27 + \sqrt{15}$

[D] $24 + \sqrt{15}$

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

$$\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = \frac{5}{3}$$

$$\Rightarrow \frac{\sec\theta}{\tan\theta} = \frac{5+3}{5-3}$$

$$\sec\theta = 4$$

$$\tan\theta = \sqrt{\sec^2\theta - 1} = \sqrt{15}$$

$$\begin{aligned} & (\sec\theta + \tan\theta) \times (\sec\theta + \tan\theta) \\ &= (\sec\theta + \tan\theta)^2 = (4 + \sqrt{15})^2 \\ &= 31 + 8\sqrt{15} \end{aligned}$$

55. If $\frac{1 + \cos\theta}{1 - \cos\theta} = \frac{m^2}{n^2}$ then the value of $\left[\frac{m^2 + n^2}{mn}\right]$ is:

यदि $\frac{1 + \cos\theta}{1 - \cos\theta} = \frac{m^2}{n^2}$ है, तो $\left[\frac{m^2 + n^2}{mn}\right]$ का मान ज्ञात कीजिए।

[RRB GROUP – D 2026]

[A] cosec θ + cot θ

✓ [B] 2cosec θ

[C] 2cos θ

[D] (sec θ + tan θ)²

$$\sec\theta = \frac{m^2 + n^2}{m^2 - n^2} \rightarrow H \quad \text{and} \quad B$$

$$P = 2mn$$

$$\frac{m^2 + n^2}{2mn} \Rightarrow \sec\theta$$

#

Basic सवाल



56. Find the value of $\frac{1}{\sec^2 A} + \frac{1}{1 + \cot^2 A}$.

$\frac{1}{\sec^2 A} + \frac{1}{1 + \cot^2 A}$ का मान ज्ञात कीजिए।

[A] 0

[B] 1

[C] $\tan^2 A$

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

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

57. **Simplify:**/निम्न को सरल कीजिए:

$$\sec^2 \beta - \frac{1}{\text{cosec}^2 \beta - 1} = \text{?}$$

[A] 0

[B] cosec β

[C] sec β

✓ [D] 1

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

58. **Simplify:** / निम्न को सरल कीजिए:

$$\frac{(\tan^2 \beta \cdot \operatorname{cosec}^2 \beta)}{(1 + \tan^2 \beta)}$$

[A] $\tan \beta$

[C] -1

~~[B]~~ 1

[D] $\sec \beta$

$$\text{Ans} = \frac{\cancel{\sec}^2 \beta}{\cancel{\sec}^2 \beta}$$

$$\tan^2 \beta \times \frac{\sec^2 \beta}{\sec^2 \beta}$$

$$\tan^2 \beta \times 1$$

59. The value of $\frac{32}{\sec^2 \theta} - \frac{20}{1+\tan^2 \theta} + 12\sin^2 \theta$ is:

$\frac{32}{\sec^2 \theta} - \frac{20}{1+\tan^2 \theta} + 12\sin^2 \theta$ का मान है:
(SSC SELECTION POST XI 2023)

[A] 20

[B] 32

[C] 24

[D] 12

$$\begin{aligned} & \frac{32}{\sec^2 \theta} - \frac{20}{1+\tan^2 \theta} + 12\sin^2 \theta \\ &= 12 \times (\cancel{C^2 + S^2}) \end{aligned}$$

60. $\frac{6}{1+\tan^2\alpha} + \frac{2}{1+\cot^2\alpha} + 4\sin^2\alpha - 1 = ?$

[A] 2

[B] 3

[C] 4

[D] 5 ✓

$$6\cancel{C^2} + \cancel{2S^2} + 4S^2 - 1$$

$$= 6 - 1$$

61. **Simplify:** $\left(1 - \frac{1}{\cos \theta}\right) \left(\frac{1 + \sec \theta}{\tan^2 \theta}\right)$
 $\left(1 - \sec \theta\right) \left(\frac{1 + \sec \theta}{\tan^2 \theta}\right)$ को सरल करें।

(RRB GROUP-D 2025)

[A] 1

[B] $-\tan \theta$

☒ [C] -1

[D] $\tan \theta$

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

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

62. **Simplify:** $\frac{\sin^2 \theta (1 + \cot^2 \theta)}{\sec^2 \theta - 1}$

$\frac{\sin^2 \theta (1 + \cot^2 \theta)}{\sec^2 \theta - 1}$ का मान ज्ञात कीजिए।

(RRB GROUP-D 2025)

[A] cosec²θ

[B] 1 - cot² θ

[C] tan² θ

✓ [D] cot² θ

1
tan² θ

63. **Simplify:**/सरल कीजिए:

$$\frac{\sin A \tan A}{(1 - \cos A)}$$

[A] $1 + \cos A$

[C] $1 + \operatorname{cosec} A$

$$S^2 = (1 - C)(1 + C)$$

☒ [B] $1 + \sec A$

[D] $1 + \sin A$

$$\frac{S^2}{C \cdot (1 - C)} = \frac{1 + C}{C}$$

$$= \sec A + 1$$

64. The value of $(1 + \cot^2 \theta)(1 + \cos \theta)(1 - \cos \theta) - (1 - \sin \theta)(1 + \sin \theta)(1 + \tan^2 \theta)$: (θ lies in first quadrant).

$(1 + \cot^2 \theta)(1 + \cos \theta)(1 - \cos \theta) - (1 - \sin \theta)(1 + \sin \theta)(1 + \tan^2 \theta)$ का मान क्या है:
(θ पहले चतुर्थांश में स्थित है)

(RRB TECHNICIAN GRADE-3, 2024)

[A] 0 ✓

[B] 1

[C] 2

[D] 4

$$= 1 - 1$$

$$= 0$$

65. Find the value of $\frac{2\sqrt{\operatorname{cosec}^2 A - 1} \times \sqrt{1 - \cos^2 A}}{\sqrt{1 + \tan^2 A} \times 3\sqrt{1 - \sin^2 A}}$.

$\frac{2\sqrt{\operatorname{cosec}^2 A - 1} \times \sqrt{1 - \cos^2 A}}{\sqrt{1 + \tan^2 A} \times 3\sqrt{1 - \sin^2 A}}$ का मान ज्ञात कीजिए।

(RRB GROUP-D 2025)

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

[B] $\cos A$

[C] $\frac{2\cos A}{3}$

[D] $\frac{2\sin A}{3}$

$$\frac{2}{3} \times \frac{\cancel{\cos A} \times \cancel{S}}{\cancel{\sec A} \times \cancel{C}}$$

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

~~$$\frac{\sin A}{1 + \cos A} = \frac{1 - \cos A}{\sin A}$$~~

67. **Simplify:**/निम्न को सरल कीजिए:

$$\frac{\cos \alpha}{1 - \sin \alpha} - \frac{1 + \sin \alpha}{\cos \alpha}$$

(RRB NTPC 12th LEVEL 2025)

RRB ALP CBT-1 2025

[A] 0 ✓

[C] 1

[B] $\sin^2 \alpha$

[D] $\cos^2 \alpha$

$$\frac{\cos \alpha}{1 - \sin \alpha} \rightarrow \frac{1 + \sin \alpha}{\cos \alpha}$$

68. **Simplify:** को सरलीकृत कीजिए।

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

RRB NTPC GRADUATE LEVEL CBT-1 2025

[A] $2 \operatorname{cosec}\theta$

[B] $2 \sin\theta$

[C] $2 \sec\theta$

[D] $2 \cos\theta$

$$\begin{aligned} & \frac{1-S}{C} + \frac{1+S}{C} \\ &= \frac{2}{C} \\ &= 2 \sec\theta \end{aligned}$$

$$\frac{C}{1+S} \Rightarrow \frac{1-S}{C}$$

69. The value of $\left[\frac{\cos 50^\circ}{1+\sin 50^\circ} \right] + \left[\frac{1+\sin 50^\circ}{\cos 50^\circ} \right]$ is:

$\left[\frac{\cos 50^\circ}{1+\sin 50^\circ} \right] + \left[\frac{1+\sin 50^\circ}{\cos 50^\circ} \right]$ का मान ज्ञात कीजिए।

(RRB TECHNICIAN GRADE-3 2024)

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

[B] $2 \sec 50^\circ$

[C] $2 \cot 50^\circ$

[D] $2 \operatorname{cosec} 50^\circ$

Trigonometry Ratio Table

$$180^\circ = \pi \text{ Radians}$$



Angle (in Degrees)	(0°)	(30°)	(45°)	(60°)	(90°)
Angle (in Radians)	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
Sin θ	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
Cos θ	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
# Tan θ	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not Defined
Cot θ	Not Defined	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
Sec θ	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	Not Defined
Cosec θ	Not Defined	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

$$\sqrt{\frac{0}{4}}$$

$$0$$

$$\sqrt{\frac{1}{4}}$$

$$\frac{1}{2}$$

$$\sqrt{\frac{2}{4}}$$

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

$$\sqrt{\frac{3}{4}}$$

$$\frac{\sqrt{3}}{2}$$

$$\sqrt{\frac{4}{4}}$$

$$1$$

70. If $\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4$, $0^\circ < \theta < 90^\circ$, then the value of $(\tan\theta + \operatorname{cosec}\theta)$ is:

यदि $\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4$, $0^\circ < \theta < 90^\circ$ है, तो $(\tan\theta + \operatorname{cosec}\theta)$ का मान होगा-

[A] $5\frac{\sqrt{2}}{2}$

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

[B] $5\frac{\sqrt{3}}{3}$

[D] $5\frac{\sqrt{2}}{3}$

$$\sqrt{3} + \frac{2}{\sqrt{3}} = \frac{5}{\sqrt{3}}$$

$$\frac{\cancel{C} \times \cancel{2}}{\cancel{C}^2} = \cancel{4}^2$$

$$\sec\theta = 2 \Rightarrow \theta = 60^\circ$$

71. Find the value of the given expression. $\frac{\cos A}{1 - \tan A} + \frac{\sin^2 A}{\sin A - \cos A} + 2\sin A - \cos A$.

दिए गए व्यंजक का मान ज्ञात कीजिए। $\frac{\cos A}{1 - \tan A} + \frac{\sin^2 A}{\sin A - \cos A} + 2\sin A - \cos A$

RRB TECHNICIAN GRADE-1 2024

[A] $3 \sin A$

[B] $\sin A$

[C] $3 \cos A$

[D] $\cos A$

$$\frac{C^2}{C-S} - \frac{S^2}{(C-S)} + 2S - C$$

$$\frac{C}{C-S}$$

$$a^2 - b^2 = (a-b)(a+b)$$

$$= \frac{C^2 - S^2}{C-S} + 2S - C$$

$$= \cancel{C} + S + 2S - \cancel{C}$$

72. **Simplify:**/सरल कीजिए।

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

~~(1+Q) + (1-Q)~~
[A] 3

[C] 4

✓ [B] 2

[D] 1

$$\sin^2 A = (1 - \cos A)(1 + \cos A)$$

73. **Simplify:** / को सरल कीजिए।

$$\frac{\sin A \cdot \tan A}{1 - \cos A} - \frac{\cos A \cdot \cot A}{1 - \sin A}$$

RRB ALP CBT-1 2025

- [A] $\sec A - \operatorname{cosec} A$
 [C] $\cos A - \sin A$

- [B] $\operatorname{cosec} A - \sec A$
 [D] $\sin A - \cos A$

$$\begin{aligned} & \frac{\frac{\sin^2 A}{\cos A}}{1 - \cos A} - \frac{\frac{\cos^2 A}{\sin A}}{1 - \sin A} \\ &= \frac{1 + \cos A}{\cos A} - \frac{1 + \sin A}{\sin A} \\ &= (\sec A + 1) - (\csc A + 1) \end{aligned}$$

74. Let $\theta \in (0, \pi/2)$ and $\tan \theta + \cot \theta = 5$ then what is the value of $\sec \theta \operatorname{cosec} \theta$

यदि $\theta \in (0, \pi/2)$ और $\tan \theta + \cot \theta = 5$ दिया गया हो, तो $\sec \theta \operatorname{cosec} \theta$ का मान ज्ञात कीजिए।

RRB GROUP-D 2024

[A] (-5)

[B] $(\frac{1}{5})$

[C] $(\frac{2}{5})$

[D] ~~None~~

$$\tan\theta + \cot\theta = \frac{1}{\sin\theta.\cos\theta} = \sec\theta.\operatorname{cosec}\theta$$



$= 2680$

76. Find the value of $\left[\frac{2\cos A}{(1-\sin A)} + \frac{2\cos A}{(1+\sin A)} \right] \times 3\sqrt{\sec^2 A - 1}$.

$\left[\frac{2\cos A}{(1-\sin A)} + \frac{2\cos A}{(1+\sin A)} \right] \times 3\sqrt{\sec^2 A - 1}$ का मान ज्ञात करें।
(RRB GROUP-D 2025)

[A] 12 secA tanA

[B] 4 secA

[C] 18 secA tanA

[D] 12 tanA

$$\frac{2\cos A \times 2}{2} \times 3 \tan A$$

$$12 \sec A \cdot \tan A$$

77. The value of $(1 + \cot^2\theta)(1 + \cos\theta)(1 - \cos\theta) - (1 - \sin\theta)(1 + \sin\theta)(1 + \tan^2\theta)$: (θ lies in first quadrant).

$(1 + \cot^2\theta)(1 + \cos\theta)(1 - \cos\theta) - (1 - \sin\theta)(1 + \sin\theta)(1 + \tan^2\theta)$ का मान क्या है: (θ पहले चतुर्थांश में स्थित है).

RRB TECHNICIAN GRADE-3 2024., RRB ALP 2024

[A] 0

[B] 1

[C] 2

[D] 4

78. $\left(\frac{1}{\cos\theta} - \frac{1}{\sin\theta}\right) + \left(\frac{1}{\operatorname{cosec}\theta - \cot\theta}\right) - \left(\frac{1}{\sec\theta + \tan\theta}\right) = ?$

[A] $\sec\theta \operatorname{cosec}\theta$

[B] $\sin\theta \tan\theta$

[C] $\operatorname{cosec}\theta \cot\theta$

[D] $\sin\theta \cos\theta$

$$\left(\frac{1}{\cos\theta} - \frac{1}{\sin\theta}\right) + \left(\frac{1}{\operatorname{cosec}\theta - \cot\theta}\right) - \left(\frac{1}{\sec\theta + \tan\theta}\right)$$

$$= \cot\theta + \tan\theta$$

79. Simplify: $\frac{(\sin\theta - \cos\theta)(1 + \tan\theta + \cot\theta)}{1 + \sin\theta\cos\theta} + \frac{\sin\theta}{1 + \cos\theta} + \frac{1 + \cos\theta}{\sin\theta}$.

निम्न को सरल कीजिए: $\frac{(\sin\theta - \cos\theta)(1 + \tan\theta + \cot\theta)}{1 + \sin\theta\cos\theta} + \frac{\sin\theta}{1 + \cos\theta} + \frac{1 + \cos\theta}{\sin\theta}$

(RRB NTPC 12th LEVEL 2025)

[A] cosec θ + sec θ

[B] sin θ + sec θ

[C] sin θ + cos θ

[D] tan θ + sec θ

$$\frac{(\cancel{\sin\theta} - \cancel{\cos\theta}) \cdot \left(\frac{\cancel{\sec\theta} + 1}{\cancel{\sec\theta}} \right)}{(1 + \cancel{\sec\theta})} + \frac{\cancel{\sin\theta}}{\cancel{\sec\theta}}$$

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