



23.

$$\frac{1}{\text{cosec}A - \cot A} - \frac{1}{\sin A} = ?$$

[A] $\frac{1}{\sin A} + \frac{1}{\text{cosec}A + \cot A}$

[C] $\frac{1}{\sin A} - \frac{1}{\text{cosec}A - \cot A}$

[B] $\frac{1}{\sin A} - \frac{1}{\text{cosec}A + \cot A}$

[D] $\frac{1}{\sin A} + \frac{1}{\text{cosec}A - \cot A}$

~~$\text{cosec}A - (\text{cosec}A - \cot A)$~~

~~$\text{cosec}A + \cot A - \text{cosec}A$~~
 $= \cot A$

24. If $\tan 9^\circ = \frac{p}{q}$, then the value of $\frac{\sec^2 81^\circ}{1 + \cot^2 81^\circ}$ is

यदि $\tan 9^\circ = \frac{p}{q}$, तो $\frac{\sec^2 81^\circ}{1 + \cot^2 81^\circ}$ का मान है

[A] $\frac{p}{q}$

[C] $\frac{p^2}{q^2}$

[B] $\frac{p^2}{p^2 + q^2}$

☒ [D] $\frac{q^2}{p^2}$

$$= \frac{\sec^2 81^\circ}{\sec^2 81^\circ}$$

$$= \tan^2 81^\circ$$

$$= \left(\frac{q}{p}\right)^2$$

$$\tan 9^\circ \times \tan 81^\circ = 1$$

25. If $2\tan x + 3\cot x = 7$, then the value of $4\tan^2x + 9\cot^2x$ is:

यदि $(2\tan x + 3\cot x) = 7$ है, तो $4\tan^2x + 9\cot^2x$ का मान ज्ञात कीजिए।

[A] 37

[B] 31

[C] 32

[D] 40

$$\underline{4\tan^2x + 9\cot^2x + 12 = 49}$$



26. If $\sec^2 A + \tan^2 A = \frac{4}{17}$, $\sec^4 A - \tan^4 A$ is equal to:

यदि $\sec^2 A + \tan^2 A = \frac{4}{17}$ है, तो $\sec^4 A - \tan^4 A$ का मान क्या होगा?

(SSC CGL 2022)

[A] 13/17

[B] 4/13

✓ [C] 4/17

[D] 5/17

$$(\sec^2 A)^2 - (\tan^2 A)^2$$

$$= 1 \times (\sec^2 A + \tan^2 A)$$

$$= \frac{4}{17}$$

27. If $\operatorname{cosec}^2\theta + \cot^2\theta = \frac{1}{2}$, where $0 \leq \theta \leq \frac{\pi}{2}$, then the value of $\cot^4\theta - \operatorname{cosec}^4\theta$ is:

यदि $\operatorname{cosec}^2\theta + \cot^2\theta = \frac{1}{3}$ जहाँ $0 \leq \theta \leq \frac{\pi}{2}$, तो $(\cot^2\theta)^2 - (\operatorname{cosec}^2\theta)^2$ का मान --- है।

[A] $2/3$

[B] $-1/3$

[C] $1/3$

[D] $-2/3$

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

28. If $1 + \sin^2 \theta = a \cos^2 \theta$, then find $\sec^4 \theta - \tan^4 \theta$.

यदि $1 + \sin^2 \theta = a \cos^2 \theta$, तो $(\sec^2 \theta)^2 - (\tan^2 \theta)^2$ ज्ञात कीजिए।

(SSC SELECTION POST XI 2023)

[A] a^{-2}

[B] a^{-1}

[C] a

[D] a^2

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

$$= 1 \times (\sec^2 \theta + \tan^2 \theta) \\ = a$$



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

$$(\sin\theta - \cos\theta)^2 = 1 - 2\sin\theta.\cos\theta$$

$$(\tan\theta + \cot\theta)^2 = \tan^2\theta + \cot^2\theta + 2 = \sec^2\theta + \operatorname{cosec}^2\theta = \sec^2\theta.\operatorname{cosec}^2\theta$$

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



29. If $\sin t + \cos t = \frac{4}{5}$, then find $\sin t \cdot \cos t$.

यदि $(\sin t + \cos t) = \frac{4}{5}$ है, तो $\sin t \cdot \cos t$ का मान ज्ञात कीजिए।

SSC CGL 2023 PRE

[A] $\frac{9}{50}$

[C] $\frac{9}{50}$

[B] $\frac{-8}{50}$

☒ [D] $\frac{-9}{50}$

$$1 + 2SC = \frac{16}{25}$$

$$2SC = -\frac{9}{25}$$

$$S.C = -\frac{9}{50}$$

30. If $\sin\theta + \cos\theta = \frac{\sqrt{11}}{3}$, then what is $\tan\theta + \cot\theta$ equal to?

यदि $\sin\theta + \cos\theta = \frac{\sqrt{11}}{3}$, तो $\tan\theta + \cot\theta$ किसके बराबर है?

(SSC SELECTION POST XI 2023)

[A] 5

[C] 7

✓ [B] 9

[D] 11

31. If $\sin\theta + \cos\theta = 1.25$, then find the value of $\tan\theta + \cot\theta$?

यदि $\sin\theta + \cos\theta = 1.25$ है, तो $\tan\theta + \cot\theta$ का मान ज्ञात कीजिये?

[A] $3\frac{5}{9}$

[B] 2.666

[C] 0.8

[D] $\frac{25}{16}$

$$= \frac{1}{\sec} = \frac{32}{9} = 3\frac{5}{9}$$

$$(\sin\theta + \cos\theta)^2 = \left(\frac{5}{4}\right)^2$$

$$1 + 2\sec = \frac{25}{16}$$

$$2\sec = \frac{9}{16}$$

$$\sec = \frac{9}{32}$$

32. If $\sin\theta + \cos\theta = \frac{\sqrt{3}-1}{2\sqrt{2}}$, then what is the value of $\tan\theta + \cot\theta$?

यदि $\sin\theta + \cos\theta = \frac{\sqrt{3}-1}{2\sqrt{2}}$ तो $\tan\theta + \cot\theta$ का मान क्या है?

☒ [A] $8(\sqrt{3} - 2)$

☒ [B] $12(\sqrt{3} - 2)$

☒ [C] $12(\sqrt{3} + 2)$

☒ [D] $8(\sqrt{3} + 2)$

$$\frac{1}{\sec} = \frac{-8}{(2+\sqrt{3})} \times \frac{2-\sqrt{3}}{2-\sqrt{3}}$$

$$\sec = \frac{4-2\sqrt{3}}{8}$$

$$\sec = \frac{-4-2\sqrt{3}}{8}$$

$$\sec = -\frac{(2+\sqrt{3})}{4}$$

$$= \frac{-8 \cdot (2-\sqrt{3})}{1}$$

$$= 8 \cdot (\sqrt{3}-2)$$

33. If $8\cos x - 8\sin x = 3$, then find $55\tan x + \frac{55}{\tan x}$?

यदि $8\cos x - 8\sin x = 3$ है, तो $55\tan x + \frac{55}{\tan x}$ ज्ञात कीजिये?

[A] 128

[C] 55

[B] 64

[D] None

$$55 \cdot (\tan x + \cot x)$$

$$= 55 \times \frac{1}{\sec}$$

$$= \cancel{55} \times \frac{128}{\cancel{55}}$$

$$(C - S)^2 = \left(\frac{3}{8}\right)^2$$

$$1 - 2CS = \frac{9}{64}$$

$$\frac{55}{64} = 2CS$$

$$\frac{55}{128} = CS$$

34. If $\sin\theta + \cos\theta = \frac{\sqrt{7}}{2}$, then find the value of $\tan^2\theta + \cot^2\theta$?

यदि $(\sin\theta + \cos\theta)^2 = \left(\frac{\sqrt{7}}{2}\right)^2$ है, तो $\tan^2\theta + \cot^2\theta$ का मान ज्ञात कीजिये?

[A] $5\frac{1}{9}$

[C] 3.8

[B] 5.666

[D] $\frac{135}{16}$

$$= \left(\frac{8}{3}\right)^2 - 2$$
$$= \frac{64}{9} - 2 = \frac{46}{9}$$

$$1 + 2\text{sc} = \frac{7}{4}$$

$$2\text{sc} = \frac{3}{4}$$

$$\text{sc} = \frac{3}{8}$$

$$\tan\theta + \cot\theta = \frac{1}{\text{sc}} = \frac{8}{3}$$

35. If $\tan(t) + \cot(t) = 16$, then one of the values of the expression $\frac{1}{\sin(t) + \cos(t)}$ is ____.

यदि $\tan(t) + \cot(t) = 16$, तो व्यंजक $\frac{1}{\sin(t) + \cos(t)}$ का एक मान ____ है।

SSC CPO Pre 2024

[A] 0.75

[C] 6.25

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

☒ [D] $\frac{2\sqrt{2}}{3}$

$$\frac{1}{SC} = 16$$
$$\Rightarrow SC = \frac{1}{16}$$

$$(S+C)^2 = 1 + 2 \times \frac{1}{16} = \frac{9}{8}$$

$$S+C = \frac{3}{2\sqrt{2}}$$

36. If $\tan^2\theta + \cot^2\theta = 79$ then $\sec\theta \operatorname{cosec}\theta = ?$

यदि $\tan^2\theta + \cot^2\theta = 79$ तो $\sec\theta \operatorname{cosec}\theta = ?$

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[A] 9

[C] 80

[B] 7

[D] none

$$(\tan\theta + \cot\theta) = 9$$

37. If, $\tan\theta + \cot\theta = 1.6$ then $(\operatorname{cosec}\theta - \sin\theta)(\sec\theta - \cos\theta) = ?$

यदि, $\tan\theta + \cot\theta = 1.6$ तो $(\operatorname{cosec}\theta - \sin\theta)(\sec\theta - \cos\theta) = ?$

[A] 0.625

[B] 1.333

[C] 0.8

[D] 0.48

$$\left(\frac{1}{s} - s\right) \times \left(\frac{1}{c} - c\right)$$

$$\tan\theta + \cot\theta = \frac{1.6}{1}$$

$$\downarrow$$
$$\frac{1}{sc} = \frac{8}{5}$$

$$\frac{1}{8} = 0.125$$

$$\frac{c}{s} \times \frac{s}{c} = c \cdot s = \frac{5}{8}$$


$$(1 + \tan \theta + \sec \theta) \cdot (1 + \cot \theta - \csc \theta) = 2$$

#

$$\left(1 + \frac{S}{C} + \frac{1}{C}\right) \times \left(1 + \frac{C}{S} - \frac{1}{S}\right)$$

$$\frac{(C+S+1)}{C} \times \frac{(S+C-1)}{S}$$

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

38. Find the value of $(1+\cot A - \operatorname{cosec} A)(1+\tan A + \sec A) - 3(\sin^2 A + \cos^2 A)$?

$(1+\cot A - \operatorname{cosec} A)(1+\tan A + \sec A) - 3(\sin^2 A + \cos^2 A)$ का मान ज्ञात कीजिये?

SSC CPO 2024

[A] -1

[C] 2

[B] 1

[D] -2

$$2-3$$

$$= -1$$

39. The value of expression $(1 + \sec 32^\circ + \cot 58^\circ)(1 - \operatorname{cosec} 32^\circ + \tan 58^\circ)$ is?

व्यंजक का मान $(1 + \sec 32^\circ + \cot 58^\circ)(1 - \operatorname{cosec} 32^\circ + \tan 58^\circ)$ है?

[A] 1

[B] 4

[C] 2 ✓

[D] 5

$$(1 + \sec 32^\circ + \cot 58^\circ) \cdot (1 - \operatorname{cosec} 32^\circ + \tan 58^\circ)$$

$$= 2$$

40. Simplify the following expression $\frac{(\sec\theta - \cos\theta)(\cot\theta + \tan\theta)}{(1 + \tan\theta + \sec\theta)(\sec\theta)(1 + \cot\theta - \operatorname{cosec}\theta)}$, $0^\circ < \theta < 90^\circ$?

निम्नलिखित व्यंजक $\frac{(\sec\theta - \cos\theta)(\cot\theta + \tan\theta)}{(1 + \tan\theta + \sec\theta)(\sec\theta)(1 + \cot\theta - \operatorname{cosec}\theta)}$, $0^\circ < \theta < 90^\circ$ को सरल कीजिए?

(ICAR Assistant 2022)

[A] $\frac{\tan\theta}{2}$

[B] $\frac{\cot\theta}{2}$

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

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

$$\frac{\cancel{S^2} \times \cancel{\frac{1}{S \cdot C}}}{2}$$

$$= \frac{\tan\theta}{2}$$



41. If $\tan^4 x - \tan^2 x = 1$, then the value of $\sin^4 x + \sin^2 x$ is:

यदि $\tan^4 x - \tan^2 x = 1$ है, तो $\sin^4 x + \sin^2 x$ का मान ज्ञात कीजिए:

[A] $\frac{3}{4}$

[C] 1 ✓

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

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

$\Rightarrow c^2 + s^2 = 1$

$$\tan^4 x = 1 + \tan^2 x$$

$$\frac{s^4}{c^4} = \frac{1}{c^2}$$

$$s^4 = c^2$$

42. If $\cot^2\theta + \cot^4\theta = 7$, then the value of $7\sin^4\theta + \sin^2\theta$ is:

यदि $\cot^2\theta + \cot^4\theta = 7$ है, तो $7\sin^4\theta + \sin^2\theta$ का मान ज्ञात कीजिए।

[A] 3

[C] 1 ✓

[B] 5

[D] 2

$$C^2 + S^2 = 1$$

$$\cot^2\theta \times (1 + \cot^2\theta) = 7$$

$$\frac{C^2}{S^2} \times \frac{1}{S^2} = 7$$

$$C^2 = 7S^4$$

43. If $\sec^5 x - \sec^3 x = 1$ then $\cos^2 x + \cos^5 x = ?$

यदि $\sec^5 x - \sec^3 x = 1$ तो $\cos^2 x + \cos^5 x = ?$

[A] 1 ✓

[C] $3/2$

[B] 0

[D] $1/2$

$$\sec^3 x \times \sec^2 x = 1$$

$$\frac{1}{\cos^3} \times \frac{1}{\cos^2} = 1$$

$$\sec^5 x = \cos^5 x$$

44. If $\operatorname{cosec}\theta + \operatorname{cosec}^2\theta = 1$ then $\cot^{12}\theta - 3\cot^{10}\theta + 3\cot^8\theta - \cot^6\theta = ?$

यदि $\operatorname{cosec}\theta + \operatorname{cosec}^2\theta = 1$ तो $\cot^{12}\theta - 3\cot^{10}\theta + 3\cot^8\theta - \cot^6\theta = ?$

[A] -2

[B] -1

[C] 0

[D] 1

$$1 = (\cot^4\theta - \cot^2\theta)^3$$
$$(\cot^4\theta - \cot^2\theta)^3 = 1^3$$

$$\operatorname{cosec}\theta - 1 = -\operatorname{cosec}\theta$$

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

$$\cot^4\theta = \operatorname{cosec}^2\theta$$

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

45. If $\sec^2 x - \sec x = 1$, then $\tan^6 x + 3 \tan^{10} x - 3 \tan^8 x - \tan^{12} x + 4 = ?$

यदि $\sec^2 x - \sec x = 1$, तो $\tan^6 x + 3 \tan^{10} x - 3 \tan^8 x - \tan^{12} x + 4 = ?$

[A] 4

[B] 3

[C] 5

[D] 6

$$\sec^2 x - 1 = \sec x$$

$$(\tan^2 x)^2 = \sec^2 x$$

$$\left(\tan^2 x - \frac{\tan^4 x}{\sec^2 x} \right)^3 + 4$$

$$(-1)^3 + 4 = 3$$

46. If $\cot^4 A + \cot^2 A = 1$, then find the value of $\cos^4 A - 3\cos^2 A$.

यदि $\cot^4 A + \cot^2 A = 1$ है तो $\cos^4 A - 3\cos^2 A$ का मान ज्ञात कीजिए।

(CHSL MAINS 2023)

[A] -1
[C] 2

[B] -2
[D] 1

$$\cot^2 A \times \cot^2 A = 1$$

$$\frac{C^2}{S^2} \times \frac{1}{S^2} = 1$$

$$C^2 = (S^2)^2$$

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

$$C^2 = 1 - 2C^2 + C^4$$

$$-1 = C^4 - 3C^2$$

47. If $0^\circ < \theta < 90^\circ$ and $\operatorname{cosec} \theta = \cot^2 \theta$, then the value of expression $\operatorname{cosec}^4 \theta - 2\operatorname{cosec}^3 \theta + \cot^2 \theta$ is equal to:

अगर $0^\circ < \theta < 90^\circ$ और $\operatorname{cosec} \theta = \cot^2 \theta$ तो व्यंजक $\operatorname{cosec}^4 \theta - 2\operatorname{cosec}^3 \theta + \cot^2 \theta$ का मान बराबर है:

[A] 2

[B] 0

[C] 1

[D] 3

$$(\operatorname{cosec}^4 \theta - 2\operatorname{cosec}^3 \theta + \operatorname{cosec}^2 \theta) - 1$$

$$(\operatorname{cosec}^2 \theta - \cancel{\operatorname{cosec} \theta})^2 - 1$$

$$1^2 - 1 = 0$$



48. If $\sec\theta = 4x$ and $\tan\theta = \frac{4}{x}$, ($x \neq 0$) then the value of $12\left(x^2 - \frac{1}{x^2}\right)$ is:

यदि $\sec\theta = 4x$ और $\tan\theta = \frac{4}{x}$, ($x \neq 0$) है तो $12\left(x^2 - \frac{1}{x^2}\right)$ का मान है:

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

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

[C] 1

[D] $\frac{3}{4}$

$$1 = 16x^2 - \frac{16}{x^2}$$
$$\frac{16}{16} = 16\left(x^2 - \frac{1}{x^2}\right)$$

49. If $6x = \operatorname{cosec}\theta$ and $\frac{6}{x} = \cot\theta$, then find the value of $18(x^2 - \frac{1}{x^2})$.

यदि $6x = \operatorname{cosec}\theta$ तथा $\frac{6}{x} = \cot\theta$, तो $18(x^2 - \frac{1}{x^2})$ का मान ज्ञात कीजिए।

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

[B] $\frac{1}{3}$

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

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

$$\frac{36x^2 - \frac{36}{x^2}}{2} = \frac{1}{2}$$