

1. If $\cot\theta = \sqrt{2} + 1$, then $\operatorname{cosec}\theta \sec\theta = ?$

यदि $\cot\theta = \sqrt{2} + 1$ है, तो $\operatorname{cosec}\theta \cdot \sec\theta$ का मान ज्ञात करें।

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

(b) $4\sqrt{2}$

(c) $\frac{\sqrt{2}}{4}$

(d) $2\sqrt{2}$ ✓

↓
 $= \frac{\tan\theta + \cot\theta}{\sqrt{2} + 1}$

2. If $\tan\theta = \frac{2}{\sqrt{13}}$, then the value of $\frac{3\operatorname{cosec}^2\theta + 2\sec^2\theta}{5\operatorname{cosec}^2\theta - 4\sec^2\theta}$ will be:

यदि $\tan\theta = \frac{2}{\sqrt{13}}$, तो $\frac{3\operatorname{cosec}^2\theta + 2\sec^2\theta}{5\operatorname{cosec}^2\theta - 4\sec^2\theta}$ का मान होगा:

(a) $\frac{41}{45}$

(c) $\frac{46}{53}$

☒ (b) $\frac{47}{49}$

(d) $\frac{5}{7}$

$$\tan\theta = \frac{\sec\theta}{\operatorname{cosec}\theta} = \frac{2}{\sqrt{13}}$$

$$\frac{39+8}{65-16}$$



Test RankING

3. If $\sin 2\theta = \frac{2}{5}$ then what is $\sin^6 \theta + \sin^4 \theta + \cos^6 \theta + \cos^4 \theta$ equal to?

यदि $\sin 2\theta = \frac{2}{5}$ है तो $\sin^6 \theta + \sin^4 \theta + \cos^6 \theta + \cos^4 \theta$ किसके बराबर है?

(a) 1.8

(b) 1.6

(c) 1.4

(d) 1.8

$$\cancel{\sin} 2\theta = \frac{2}{5}$$

$$= 1 - 3\sin^2 \theta + 1 - 2\sin^2 \theta$$

$$= 2 - 5\sin^2 \theta$$

$$= 2 - 5 \times \frac{1}{5}$$

$$= 1.8$$



Test RanKING

4. If $\sin\theta + \operatorname{cosec}\theta = k$, then what is the value of $\cos^2\theta - \cot^2\theta$?

यदि $(\sin\theta + \operatorname{cosec}\theta) = k$ है तो $\cos^2\theta - \cot^2\theta$ का मान क्या है?

(a) $3 - k^2$

(b) $4 - k^2$

(c) $k^2 - 4$

(d) $k^2 + 2$

$$\sin\theta + \operatorname{cosec}\theta = k$$

$$1 - \cos^2\theta + 1 + \cot^2\theta = k^2$$

5. If $5\sin^2\theta = 3(1 + \cos\theta)$, $0^\circ < \theta < 90^\circ$, then the value of $\operatorname{cosec}\theta + \cot\theta$ is:

यदि $5\sin^2\theta = 3(1 + \cos\theta)$, $0^\circ < \theta < 90^\circ$ है, तो $\operatorname{cosec}\theta + \cot\theta$ का मान ज्ञात करें।

$$\frac{5}{\sqrt{21}} + \frac{2}{\sqrt{21}} = \frac{7}{\sqrt{21}} = \frac{\sqrt{7}}{\sqrt{3}}$$

(a) $\sqrt{\frac{7}{3}}$

(b) $\frac{5}{\sqrt{21}}$

(c) $\frac{4}{\sqrt{21}}$

(d) $\sqrt{\frac{3}{7}}$

$$5(1+c)(1-c) = 3(1+c)$$

$$1-c = \frac{3}{5}$$

$$\cos\theta = \frac{2}{5} \rightarrow B$$

$$\sqrt{21} \rightarrow P$$

6. If $5 \sin^2 \theta + 14 \cos \theta = 13$, $0^\circ < \theta < 90^\circ$, then what is the value of $\frac{\sec \theta + \cot \theta}{\operatorname{cosec} \theta + \tan \theta}$?

यदि $5 \sin^2 \theta + 14 \cos \theta = 13$, $0^\circ < \theta < 90^\circ$ है, तो $\frac{\sec \theta + \cot \theta}{\operatorname{cosec} \theta + \tan \theta}$ का मान क्या होगा?

a) $\frac{9}{8}$

b) $\frac{31}{29}$

c) $\frac{21}{28}$

d) $\frac{32}{27}$

$$5(1 - C^2) + 14C = 13$$

$$5C^2 - 14C + 8 = 0$$

$\frac{14}{5} \rightarrow 40$
 $\frac{-8}{5} \rightarrow -14$

$$C80 = \frac{+10}{5} \text{ and } \frac{+4}{5}$$

$$C80 = \frac{4}{5} \rightarrow B$$

$5 \rightarrow H$
 $3 \rightarrow P$

7. If $6 - 4 \sin^2 \theta = 7 \sin \theta \cdot \cos \theta$ then find $\cot \theta = ?$

(a) $\frac{2}{3}$ ✓✓

(b) $\frac{3}{4}$ $\div \sin \theta$

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

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

$$6 \sec^2 \theta - 4 = 7 \cot \theta$$

$$6(1 + \cot^2 \theta) - 4 = 7 \cot \theta$$

$$6 \cot^2 \theta - 7 \cot \theta + 2 = 0$$

$$\cot \theta = \frac{+4}{3}, \frac{+3}{2}$$

8. If $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = \frac{4}{\sqrt{3}}$, $0^\circ < \theta < 90^\circ$, then the value of $(\tan\theta + \sec\theta)^{-1}$ is :

यदि $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = \frac{4}{\sqrt{3}}$, $0^\circ < \theta < 90^\circ$, तो $(\tan\theta + \sec\theta)^{-1}$ का मान है :

a) $2 + \sqrt{3}$

b) $2 - \sqrt{3}$

c) $3 - \sqrt{2}$

d) $3 + \sqrt{2}$

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

$$\frac{2}{s} = \frac{4}{\sqrt{3}}$$

$$\sin\theta = \frac{\sqrt{3}}{2} \quad \theta = 60^\circ$$

$$\frac{s}{1+c} \rightarrow \frac{1-c}{s}$$

$$= \frac{\sec\theta - \tan\theta}{2 - \sqrt{3}}$$



Test Rank

9.

Solve the following:

$$(\operatorname{cosec} 23^{\circ} - \sin 23^{\circ})(\tan 23^{\circ} + \cot 23^{\circ})(\sec 23^{\circ} - \cos 23^{\circ})$$

निम्नलिखित को हल कीजिए:

$$(\operatorname{cosec} 23^{\circ} - \sin 23^{\circ})(\tan 23^{\circ} + \cot 23^{\circ})(\sec 23^{\circ} - \cos 23^{\circ})$$

(RRB NTPC 12th LEVEL 2025)

A. 1

B. $\tan 23^{\circ}$

C. 0

D. $\sin 23^{\circ}$

$$\frac{1}{S} \rightarrow S$$

$$\frac{1}{C} \rightarrow C$$

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

10. If $\frac{(\sin\theta - \operatorname{cosec}\theta)(\cos\theta - \sec\theta)}{\tan^2\theta - \sin^2\theta} = r^3$, then $r = ?$

यदि $\frac{(\sin\theta - \operatorname{cosec}\theta)(\cos\theta - \sec\theta)}{\tan^2\theta - \sin^2\theta} = r^3$ है तो r बराबर है:

- a) $\sin\theta\cos\theta$ b) $\tan\theta$ c) $\cot\theta$ d) $\operatorname{cosec}\theta\sec\theta$

$$\swarrow \frac{1}{\sin} = \frac{\sin}{1}$$

$$\swarrow \frac{1}{\cos} = \frac{\cos}{1}$$

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

11.

If $M = \sqrt{\frac{1 + \cos A}{1 - \cos A}} - \operatorname{cosec} A - \cot A$, and A is an acute angle, then value of M is

यदि $M = \sqrt{\frac{1 + \cos A}{1 - \cos A}} - (\operatorname{cosec} A + \cot A)$ है और A एक न्यून कोण है, तो M का मान ज्ञात कीजिए।

(RRB NTPC 12th LEVEL 2025)

A. 1

B. -1

C. 0

D. 2

$$\sqrt{\frac{1 + \cos A}{1 - \cos A}} = \sqrt{\frac{H+C}{1-C} \times \frac{H+C}{H+C}} = \frac{H+C}{S} = \operatorname{cosec} A + \cot A$$

12. $\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)} \times \frac{\sqrt{\sec^2\theta+\operatorname{cosec}^2\theta}}{\tan\theta+\cot\theta}, 0^\circ < \theta < 90^\circ$, is equal to:

$\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)} \times \frac{\sqrt{\sec^2\theta \cdot \operatorname{cosec}^2\theta}}{\tan\theta+\cot\theta} = ?, 0^\circ < \theta < 90^\circ$

(a) $\tan\theta$ (b) $\sec\theta$ (c) $\operatorname{cosec}\theta$ (d) $\cot\theta$

$\frac{C(\cancel{H})}{S(\cancel{1+C})}$

13.

if, $(\sin\theta - \cos\theta)^2 = \frac{2}{5}$

then $\sin^3\theta - \cos^3\theta = ?$

$$= (5-0) \cdot (1+\text{SC})$$
$$= \frac{2}{5} \times \frac{71}{50} = \frac{71}{125}$$

a) $\frac{21}{25}$

b) $\frac{29}{25}$

c) $\frac{17}{50}$

d) $\frac{8}{15}$

$$1 - 2\text{SC} = \frac{4}{25}$$

$$\text{SC} = \frac{21}{50}$$



Test RanKING

14. In $\triangle ABC$, right angled at B, if $\tan A = \frac{1}{2}$,

then the value of $\frac{\sin A(\cos C + \cos A)}{\cos C(\sin C - \sin A)}$ is:

$\triangle ABC$ में, जो B पर समकोण है, यदि $\tan A = \frac{1}{2}$ है, तो $\frac{\sin A(\cos C + \cos A)}{\cos C(\sin C - \sin A)}$ का मान ज्ञात कीजिए।

(a) $2\sqrt{5}$

(b) 3

(c) 2

(d) 1

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

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

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

15. What is the simplified value of $\frac{\sin^3 21^\circ + \cos^3 19^\circ}{\sin 21^\circ + \cos 19^\circ} + \sin^2 69^\circ + \cos^2 71^\circ + \frac{1}{\sec 69^\circ \operatorname{cosec} 71^\circ}$ is:

$\frac{\sin^3 21^\circ + \cos^3 19^\circ}{\sin 21^\circ + \cos 19^\circ} + \sin^2 69^\circ + \cos^2 71^\circ + \frac{1}{\sec 69^\circ \operatorname{cosec} 71^\circ}$ का सरलीकृत मान क्या है:

- A) 3 B) 1 C) 4 D) 2

$$\sin^3 21^\circ + \cos^3 19^\circ - \sin 21^\circ \cdot \cos 19^\circ + \sin^2 69^\circ + \cos^2 71^\circ + \frac{\cos 69^\circ \cdot \sin 71^\circ}{\sin 21^\circ \cdot \cos 19^\circ}$$

$$= 1 + 1$$

16. The value of $\frac{(\tan 25^\circ \cot 65^\circ - \operatorname{cosec}^2 65^\circ) + \cot^2 61^\circ - \sec^2 29^\circ}{\sin^2 5^\circ + \sin^2 7^\circ + \sin^2 9^\circ + \dots + \sin^2 85^\circ}$ is:

$\frac{(\tan 25^\circ \cot 65^\circ - \operatorname{cosec}^2 65^\circ) + (\cot^2 61^\circ - \sec^2 29^\circ)}{\sin^2 5^\circ + \sin^2 7^\circ + \sin^2 9^\circ + \dots + \sin^2 85^\circ}$ का मान ज्ञात करें।

- (a) $\frac{2}{45}$
- (b) $\frac{4}{45}$
- (c) $\frac{-2}{41}$
- (d) $\frac{-4}{41}$ ✓

$$\frac{85-5}{2} + 1 = 41 \text{ terms} + \sin^2 45^\circ$$

$$40 + \frac{1}{2} = \frac{41}{2}$$

$$\sin^6 1^\circ + \sin^6 2^\circ + \sin^6 3^\circ + \dots + \sin^6 88^\circ + \sin^6 89^\circ + \sin^6 90^\circ$$

$$1 + (\sin^6 1^\circ + \cos^6 1^\circ) + (\sin^6 2^\circ + \cos^6 2^\circ) + \dots + (\sin^6 44^\circ + \cos^6 44^\circ)$$

$$\frac{9}{8} + \left(1 - \frac{3}{4} \sin^2 2^\circ\right) + \left(1 - \frac{3}{4} \sin^2 4^\circ\right) + \dots + \left(1 - \frac{3}{4} \sin^2 88^\circ\right) + \sin^6 45^\circ$$

$$= \frac{9}{8} + 44 - \frac{3}{4} (\sin^2 2^\circ + \sin^2 4^\circ + \dots + \sin^2 88^\circ)$$

$$= \frac{9}{8} + 44 - \frac{3}{4} \times 42 = \frac{9 + 352 - 126}{8} = \frac{235}{8} \checkmark$$

17. The value of $\frac{(\sin 17^\circ + \cos 73^\circ)(\sec 73^\circ + \operatorname{cosec} 17^\circ)}{\operatorname{cosec}^2 71^\circ + \cos^2 15^\circ - \tan^2 19^\circ + \cos^2 75^\circ}$ is:

$$\frac{(\sin 17^\circ + \cos 73^\circ)(\sec 73^\circ + \operatorname{cosec} 17^\circ)}{\operatorname{cosec}^2 71^\circ + \cos^2 15^\circ - \tan^2 19^\circ + \cos^2 75^\circ} = ?$$

(a) 1

(b) 4

(c) -3

(d) 2

$$\frac{2 \sin 17^\circ \times 2 \sec 17^\circ}{1+1} = 2$$

18. The value of $\frac{\tan(45^\circ - \alpha)}{\cot(45^\circ + \alpha)} - \frac{(\cos 19^\circ + \sin 71^\circ)(\sec 19^\circ + \csc 71^\circ)}{\tan 12^\circ \tan 24^\circ \tan 66^\circ \tan 78^\circ}$ is:

$\frac{\cancel{\tan(45^\circ - \alpha)}}{\cancel{\cot(45^\circ + \alpha)}} - \frac{(\cos 19^\circ + \overset{\text{68/90}}{\sin 71^\circ})(\overset{\text{sec 19}}{\sec 19^\circ} + \csc 71^\circ)}{\cancel{\tan 12^\circ \tan 24^\circ \tan 66^\circ \tan 78^\circ}}$ का मान ज्ञात करें।

(a) -3

(b) 0

(c) -2

(d) 2

$$1 - \frac{4}{1} = -3$$

19. If $\tan x = \cot(48^\circ + 2x)$, and $0^\circ < x < 90^\circ$, then what is the value of x ?

यदि $\tan x = \cot(48^\circ + 2x)$, और $0^\circ < x < 90^\circ$ है, तो x का मान ज्ञात करें?

(a) 12°

(b) 14°

(c) 16°

(d) 21°

$x = 42^\circ$

20. If $2\sec 2\theta = \tan \varphi + \cot \varphi$, then one of the values of $\theta + \varphi = ?$

यदि $2\sec 2\theta = \tan \varphi + \cot \varphi$ तो $\theta + \varphi$ का एक मान होना चाहिए =?

- (a) $\pi/2$ (b) $\pi/4$ (c) $\pi/3$ (d) $\pi/6$

~~$2\sec 2\theta = 2\sec 2\phi$~~

$\theta + \phi = 45^\circ$

21. If a, b are real numbers & $4\cos^2\theta = \frac{4a^2+9b^2+5}{a+3b}$, then

the value of $(a+b)$ will be:

यदि a, b वास्तविक संख्याये हैं और $4\cos^2\theta = \frac{4a^2+9b^2+5}{a+3b}$ हैं, तो $(a+b)$ का मान होगा:

(a) $\frac{7}{6}$
(c) $\frac{5}{4}$

(b) $\frac{11}{6}$
(d) $\frac{17}{12}$

$$\frac{4a^2+9b^2+5}{4a+12b} \leq 1$$

$$4a^2 \leq 4a+12b$$

$$4a^2 \leq 4a+12b$$

$$4a^2+9b^2+5-4a-12b \leq 0$$

$$a = \frac{1}{2} \\ b = \frac{2}{3}$$

$$(4a^2-4a+1) + (9b^2-12b+4) \leq 0$$

$$(2a-1)^2 + (3b-2)^2 = 0$$

22. $x = a + a \sin \alpha \cos \beta$, $y = b(1 + \sin \alpha \sin \beta)$, $z = c \cos \alpha$,

Then $\left(\frac{x-a}{a}\right)^2 + \left(\frac{y-b}{b}\right)^2 + \left(\frac{z}{c}\right)^2 = ?$

a) 3

b) 1

c) -1

d) 0

put $\alpha = \beta = 0^\circ$

$$x = a$$

$$y = b$$

$$z = c$$



Test Ranking

23. If $\sin\theta + \cos\theta = 1.4$, then what will be the value of $\operatorname{cosec}^2 \theta + \sec^2 \theta$?

यदि $\sin\theta + \cos\theta = 1.4$ है, तो $\operatorname{cosec}^2 \theta + \sec^2 \theta$ का मान क्या होगा?

(a) $625/144$

(b) $225/108$

(c) $625/169$

(d) $625/576$

$$\begin{aligned} &= \operatorname{cosec}^2 \theta \cdot \sec^2 \theta \\ &= \left(\frac{1}{\sin\theta}\right)^2 \\ &= \left(\frac{25}{12}\right)^2 \end{aligned}$$

(SSC CGL 2022)

$$S + C = \frac{7}{5}$$

$$1 + 2SC = \frac{49}{25}$$

$$SC = \frac{12}{25}$$



Test Ranking

24. Solve $\frac{(1 - \sin\theta + \cos\theta)^2}{2}$:

(a) $(1 - \cos\theta)(1 - \sin\theta)$

(b) $(1 + \cos\theta)(1 - \sin\theta)$

(c) $(1 + \cos\theta)(1 + \sin\theta)$

(d) $(1 - \cos\theta)(1 + \sin\theta)$

$$\frac{(1 - \sin\theta)^2 + \cos^2\theta + 2(1 - \sin\theta) \cdot \cos\theta}{2}$$

$$\frac{(1 - \sin\theta) \times (1 - \cancel{\sin\theta} + 1 + \cancel{\sin\theta} + 2\cos\theta)}{2}$$

$$= (1 - \sin\theta) \times (1 + \cos\theta)$$

25. If $\cos^2 A + \cos A = 1$ and $a \sin^{12} A + b \sin^{10} A + c \sin^8 A + d \sin^6 A = 1$, then find the value of $2a - b + 5c + 3d$.

- a) 18 b) 15
c) 12 d) 17

$$\cos A = \sin^2 A$$

$$1 - \sin^2 A = \sin^4 A$$

$$(\sin^4 A + \sin^2 A)^3 = 1^3$$

$$1 \cdot \sin^{12} A + \sin^6 A + 3 \sin^{10} A + 3 \sin^8 A = 1$$

26. If $\sin \theta + \sin^2 \theta = 1$, Then $(\cos^{12} \theta + 3\cos^{10} \theta + 3\cos^8 \theta + \cos^6 \theta) - 1 = ?$
a) 0 b) 1 c) -1 d) 2

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

$$\sin^2 \theta = \cos^4 \theta$$

$$(\sin^2 \theta + \cos^2 \theta)^3 - 1$$

$$= 1^3 - 1$$

$$= 0$$