

{ 8PM Daily → Trigo
6PM Daily → Geometry



elimination



α खत्म करना है।

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

$$a^2 \cos^2 \beta + b^2 \sin^2 \beta = 1$$

$$a^2 - a^2 \sin^2 \beta + b^2 \sin^2 \beta = 1$$

$$\sin^2 \beta \cdot (-a^2 + b^2) = 1 - a^2$$

$$\sin^2 \beta = \frac{1 - a^2}{-a^2 + b^2} = \frac{a^2 - 1}{a^2 - b^2}$$

26. If $\frac{\cos \alpha}{\cos \beta} = a$, $\frac{\sin \alpha}{\sin \beta} = b$, then $\sin^2 \beta = ?$

यदि $\frac{\cos \alpha}{\cos \beta} = a$, $\frac{\sin \alpha}{\sin \beta} = b$, $\sin^2 \beta = ?$

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

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

[C] $\frac{a^2 + 1}{a^2 + b^2}$

☒ [D] $\frac{a^2 - 1}{a^2 - b^2}$

$$\cos \alpha = a \cos \beta$$

$$\sin \alpha = b \sin \beta$$

$$\frac{9\sin^2\alpha}{32} + \frac{9\cos^2\alpha}{8} = 1$$

$$\frac{9\sin^2\alpha + 36\cos^2\alpha}{32} = 1$$

$$9 - 9\cos^2\alpha + 36\cos^2\alpha = 32$$

$$\cos^2\alpha = \frac{23}{27} \Rightarrow \sin^2\alpha = \frac{27}{27} - \frac{23}{27}$$

For the following two (02) items:

27. Let $\frac{\sin\alpha}{\sin\beta} = \frac{4\sqrt{2}}{3}$ and $\frac{\cos\alpha}{\cos\beta} = \frac{2\sqrt{2}}{3}$.

मान लीजिए $\frac{\sin\alpha}{\sin\beta} = \frac{4\sqrt{2}}{3}$ और $\frac{\cos\alpha}{\cos\beta} = \frac{2\sqrt{2}}{3}$.

A. What is $\tan^2\alpha$ equal to?

$\frac{27}{23} - 1 = \tan^2\alpha$ का मान क्या है?
(UPSC CDS - II 2025)

[A] 8
[C] $\frac{4}{23}$

[B] 6
[D] 3

$$\sin\beta = \frac{3\sin\alpha}{4\sqrt{2}}$$

$$\cos\beta = \frac{3\cos\alpha}{2\sqrt{2}}$$

27. **Let** $\frac{\sin\alpha}{\sin\beta} = \frac{4\sqrt{2}}{3}$ **and** $\frac{\cos\alpha}{\cos\beta} = \frac{2\sqrt{3}}{3}$.

मान लीजिए $\frac{\sin\alpha}{\sin\beta} = \frac{4\sqrt{2}}{3}$ और $\frac{\cos\alpha}{\cos\beta} = \frac{2\sqrt{3}}{9}$.

B. What is $\tan^2\beta$ equal to?

$\tan^2\beta$ का मान क्या है?

(UPSC CDS - II 2025)

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

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

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

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

28. If $\tan A = a \tan B$ and $\sin A = b \sin B$, then the value of $\cos^2 A$ is:

यदि $\tan A = a \tan B$ और $\sin A = b \sin B$, तो $\cos^2 A$ का मान है:

SSC CHSL PRE 2024

$$[A] = \frac{b^2 - 1}{a^2 - 1}$$

$$[c] \quad \frac{b^2+1}{a^2+1}$$

$$[\mathbf{B}] = \frac{a^2 - 1}{b^2 - 1}$$

$$[D] = \frac{a^2+1}{b^2+1}$$

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$$\sec^2 B - \cot^2 B = 1$$

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

$$\mathbb{G} + \mathbb{B} = \mathbb{Q} \mathbb{G} + A$$

$$G \otimes B = bG \otimes A$$

$$b^2 - a^2 \otimes A = 1 - \otimes A$$

$$b^2 - 1 = \phi_A(a^2 - 1)$$

$$\frac{b^2 - 1}{a^2 - 1} = \frac{b^2}{a^2}$$



29. If $\cos\theta + \cos^2\theta + \cos^3\theta = 1$, then $\sin^6\theta - 4\sin^4\theta + 8\sin^2\theta + 3 = ?$

यदि $\cos\theta + \cos^2\theta + \cos^3\theta = 1$, तो $\sin^6\theta - 4\sin^4\theta + 8\sin^2\theta + 3 = ?$

[A] 5

[B] 6

[C] 7

[D] 8

$$C + C^3 = S^2$$

$$C \cdot (1 + C^2) = S^2$$

Since $\sqrt{1-S^2} \times (2-S^2) = S^2$

$$(1-S^2) \cdot (4+S^4-4S^2) = S^4$$

$$4 + S^4 - 4S^2 - 4S^2 - S^6 + 4S^4 = S^4$$

$$4 = S^6 - 4S^4 + 8S^2$$

यदि, $a \sin \theta + b \cos \theta = c$

तो $a \cos \theta - b \sin \theta = x$ (माना)

square then add

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

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

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

30. If $a \sin \theta + b \cos \theta = c$ then $a \cos \theta - b \sin \theta = ?$

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

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

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

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

31. If $3\sin x + 4\cos x = 2$, then the value of $3\cos x - 4\sin x$ is equal to:

यदि $3\sin x + 4\cos x = 2$ है, तो $3\cos x - 4\sin x$ का मान ज्ञात कीजिए।

☒ [A] $\sqrt{21}$

[B] $\sqrt{23}$

[C] 21

[D] $\sqrt{29}$

= K (माना)

$$3^2 + 4^2 = 2^2 + K^2$$

$$25 = K^2$$

$$\sqrt{25} = K$$

32. If $(4\sin\theta + 5\cos\theta) = 3$, then the value of $(4\cos\theta - 5\sin\theta)$ is:
यदि $(4\sin\theta + 5\cos\theta) = 3$, तो $(4\cos\theta - 5\sin\theta)$ का मान क्या है?
SSC CHSL 2023 PRE = x (माना)

[A] $4\sqrt{2}$

[B] $2\sqrt{5}$

[C] $3\sqrt{2}$

[D] $2\sqrt{3}$

$$4^2 + 5^2 = 3^2 + x^2$$

$$41 - 9 = x^2$$

$$32 = x^2$$

$$4\sqrt{2} = x$$

33. $12\sin\theta + 35\cos\theta = 37$, then $35\sin\theta - 12\cos\theta = ?$

$12\sin\theta + 35\cos\theta = 37$, तो $35\sin\theta - 12\cos\theta = ?$

[A] 0 ✓

[C] 37

[B] 1

[D] 12

$$\cancel{12^2 + 35^2 = 37^2 + ?^2}$$

$$0 = ?^2$$

36. If $(a^3+b^3)\sin\theta + (a^3-b^3)\cos\theta = 7$ and $(a^3+b^3)\cos\theta - (a^3-b^3)\sin\theta = 5$, then $a^6+b^6=?$
यदि $(a^3+b^3)\sin\theta + (a^3-b^3)\cos\theta = 7$ और $(a^3+b^3)\cos\theta - (a^3-b^3)\sin\theta = 5$ है, तो $a^6+b^6=?$

[A] 24

[B] 37

[C] 35

[D] 49

$$(a^3+b^3)^2 + (a^3-b^3)^2 = 7^2 + 5^2$$

$$2(a^6+b^6) = 74$$

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

★ ★

यदि $\sin \theta + \cos \theta = k$

तो
$$\begin{cases} \sin \theta - \cos \theta = \pm \sqrt{2 - k^2} \\ \cos \theta - \sin \theta \end{cases}$$

$$(\sin \theta + \cos \theta)^2 + (\sin \theta - \cos \theta)^2 = k^2 + ?^2$$

$$2 = k^2 + ?^2$$

$$2 - k^2 = ?^2$$

$$\pm \sqrt{2 - k^2} = ?$$

34. If $\sin \theta - \cos \theta = \frac{1}{5}$, then find the value of $\sin \theta + \cos \theta$.

यदि $\sin \theta - \cos \theta = \frac{1}{5}$, तो $\sin \theta + \cos \theta$ का मान ज्ञात कीजिए।

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[A] $\frac{5}{3}$
[C] $\frac{5}{7}$

[B] $\frac{7}{5}$
[D] $\frac{3}{5}$

$$= \sqrt{2 - \frac{1}{25}}$$

$$= \sqrt{\frac{49}{25}}$$

35. If $\sin\theta + \cos\theta = \frac{\sqrt{11}}{3}$, then find $\cos\theta - \sin\theta$?

यदि $\sin\theta + \cos\theta = \frac{\sqrt{11}}{3}$, तो $\cos\theta - \sin\theta$ ज्ञात कीजिए?
(CPO 2023)

$$= \sqrt{2 - \frac{11}{9}} = \sqrt{\frac{7}{9}}$$

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

[B] $\frac{7}{3}$

[C] $\frac{5}{3}$

[D] $\frac{\sqrt{7}}{3}$

37. If $\cos 27^\circ + \sin 27^\circ = k$, then what is the value of $\cos^2 27^\circ - \sin^2 27^\circ$?

यदि $\cos 27^\circ + \sin 27^\circ = k$ है, तो $\cos^2 27^\circ - \sin^2 27^\circ$ का मान क्या है?

✓ [A] $k\sqrt{2 - k^2}$

[B] $k\sqrt{k^2 - 2}$

[C] $k\sqrt{1 - k^2}$

[D] $k\sqrt{k^2 - 1}$

✗ $\cos 27^\circ + \sin 27^\circ = k$ ✗
 $\cos 27^\circ - \sin 27^\circ = \sqrt{2 - k^2}$

38. If $\cos 41^\circ + \sin 41^\circ = k$, then what is the value of $\cos^3 41^\circ - \sin^3 41^\circ$?

यदि $\cos 41^\circ + \sin 41^\circ = k$ है, तो $\cos^3 41^\circ - \sin^3 41^\circ$ का मान क्या है?

[A] $\frac{(k^2+1)}{2} \sqrt{2-k^2}$

[B] $\frac{(k^2+1)}{2} \sqrt{k^2-2}$

[C] $\frac{(k^2-1)}{2} \sqrt{2-k^2}$

[D] $\frac{(k^2-1)}{2} \sqrt{k^2-1}$

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

$$1+2CS = k^2$$

$$CS = \frac{k^2-1}{2}$$

$$\begin{aligned} C^3 - S^3 &= (C-S) \cdot (1 + C \cdot S) \\ &\downarrow \\ &= \sqrt{2-k^2} \left[1 + \frac{k^2-1}{2} \right] \end{aligned}$$

39. If $\sin\theta + \cos\theta = \frac{23}{17}$, then $\sin\theta - \cos\theta = ?$

यदि $\sin\theta + \cos\theta = \frac{23}{17}$, तो $\sin\theta - \cos\theta = ?$

[A] $\pm \frac{15}{17}$

[C] $\pm \frac{6}{17}$

[B] $\pm \frac{9}{17}$

[D] $\pm \frac{7}{17}$

$\pm \sqrt{2 - \left(\frac{23}{17}\right)^2}$

39. If $\sin\theta + \cos\theta = \frac{23}{17}$, then $\sin\theta - \cos\theta = ?$

यदि $\sin\theta + \cos\theta = \frac{23}{17}$, तो $\sin\theta - \cos\theta = ?$

[A] $\pm \frac{15}{17}$

[C] $\pm \frac{6}{17}$

[B] $\pm \frac{9}{17}$

[D] $\pm \frac{7}{17}$

~~$\begin{cases} \frac{15}{17} - \frac{8}{17} \\ \frac{8}{17} - \frac{15}{17} \end{cases}$~~

$\sin\theta + \cos\theta = \frac{23}{17}$
 $\frac{15}{17} + \frac{8}{17} = \frac{23}{17}$
H $\rightarrow$ 17

$\pm \frac{7}{17}$

if, $\sin \theta + \cos \theta = \frac{79}{65}$

$$\frac{P+B}{H} = \frac{79}{65}$$

Diagram illustrating the relationship between the sum of sine and cosine and the hypotenuse (H). The numerator is labeled $P+B$ and the denominator is H . The fraction is equal to $\frac{79}{65}$. Red arrows indicate the mapping: $16+63$ (from the original image) points to the numerator, and 79 points to the numerator, and 65 points to the denominator.

तो $\sin \theta - \cos \theta = \pm \frac{47}{65}$



40. If $\sin\theta - \cos\theta = \frac{1}{29}$ find the value of $\sin\theta + \cos\theta$.

यदि $\sin\theta - \cos\theta = \frac{1}{29}$ है, तो $\sin\theta + \cos\theta$ का मान ज्ञात करें।

[A] $\frac{41}{29}$

[B] $\frac{22}{29}$

[B] $\frac{42}{29}$

[D] $\frac{2}{29}$

$\frac{21}{29} + \frac{20}{29}$

$\sin\theta - \cos\theta = \frac{1}{29}$

$\frac{P - B}{H} = \frac{1}{29}$

41. If $\sin A - \cos A = \frac{23}{37}$, then find the value of $\sin A + \cos A$.

यदि $\sin A - \cos A = \frac{23}{37}$ है, तो $\sin A + \cos A$ का मान ज्ञात कीजिए।

✓ [A] $\frac{47}{37}$
[C] $\frac{21}{37}$

[B] $\frac{23}{35}$
[D] $\frac{45}{37}$

$$\frac{a}{b} = \frac{5}{2}$$

$$a = 5x$$

$$b = 2x$$

42. If $\tan \theta = \frac{\sin \alpha - \cos \alpha}{\sin \alpha + \cos \alpha}$, then $\sin \alpha + \cos \alpha = ?$

यदि $\tan \theta = \frac{\sin \alpha - \cos \alpha}{\sin \alpha + \cos \alpha}$, तो $\sin \alpha + \cos \alpha = ?$

(CDS 2023)

[A] $\pm \sqrt{2} \sin \theta$

[C] $\pm \sqrt{2} \tan \theta$

☒ [B] $\pm \sqrt{2} \cos \theta$

[D] $\pm \sqrt{2} \cot \theta$

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

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$$\begin{cases} \sin \alpha - \cos \alpha = k \sin \theta \\ \sin \alpha + \cos \alpha = k \cos \theta = \pm \sqrt{2} \cos \theta \end{cases}$$

$$r = k \sin \theta + k \cos \theta$$

$$r = k$$

$$\pm \sqrt{2} = k$$