"आज PHYSICS में मचाते हैं।"

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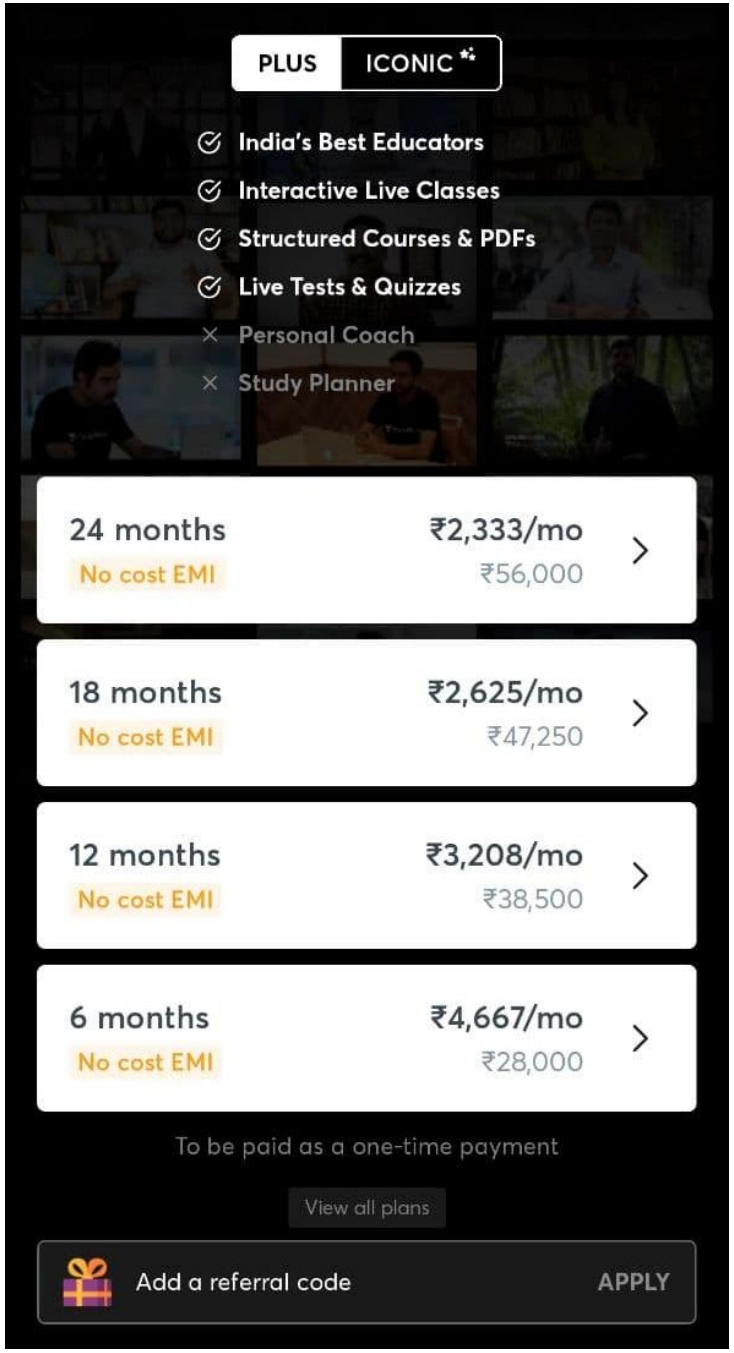

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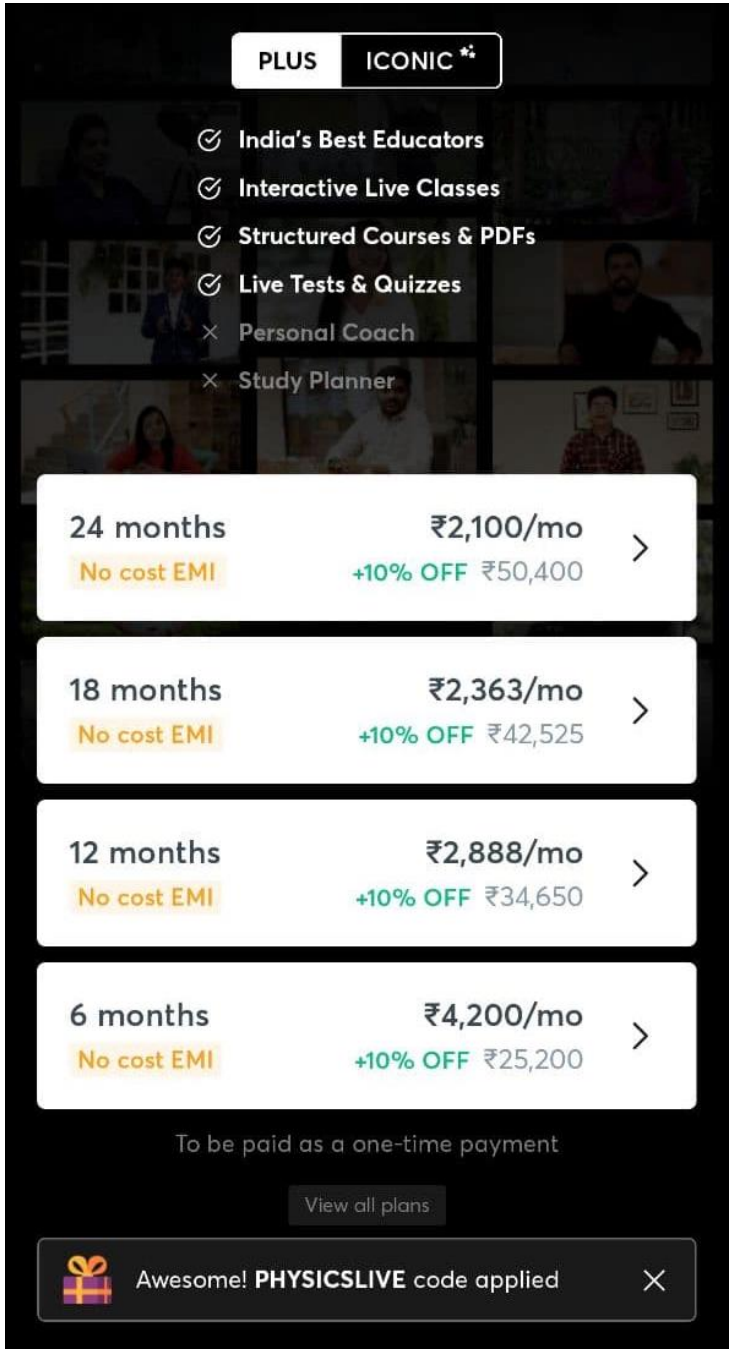

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JEE Main
Physics DPP

DPP-1 Basic Maths: Trigonometry

By Physicsaholics Team

Q) Find $\cot(\pi+x)$=?

(a) $\cot(x)$ (b) $\tan(x)$

(c) $\sin(x)$ (d) none of these

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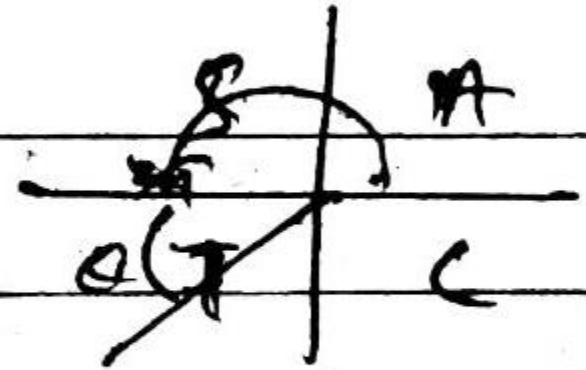
Ans. a

$\cot(\pi + \alpha) = ?$

$\tan - \pi$

$\cot \rightarrow \cot$

$\cot = +ve$



$\therefore \quad \cot(\pi + \alpha) = \cot(\alpha)$

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Q) Calculate $\tan(270°+\alpha)$.

(a) $-\tan(\alpha)$ (b) $-\cot(\alpha)$

(c) $\sin(\alpha)$ (d) none of these

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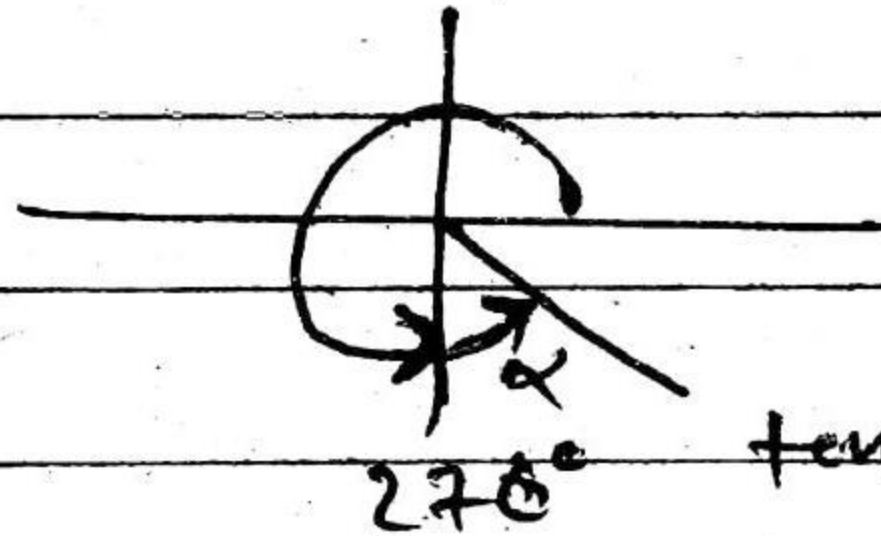
Ans. b

$$\tan(270^\circ + \alpha)$$



tan (-ve)

$$= -\cot \alpha$$

Q) Find the value of $cos\frac{14\pi}{3}$=?.

(a) 1 (b) -1

(c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

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Ans. d

$\cos \frac{14\pi}{3} = ?$

$\cos \frac{14\pi}{3} = \cos \frac{12\pi + 2\pi}{3}$

$= \cos\left(4\pi + \frac{2\pi}{3}\right) = \cos \frac{2\pi}{3}$

$= \cos \frac{2\pi}{3} = \cos\left(\pi - \frac{\pi}{3}\right) = -\cos \frac{\pi}{3}$

$= -\cos \frac{\pi}{3} = -\frac{1}{2}$

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Q) Find value of $\sin x$ if $\cos^2 x + sinx = \frac{5}{4}$

(a) 2

(b) -1

(c) $\frac{1}{2}$

(d) None of these

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Ans. c

$$\cos^2 x + \sin x = \frac{5}{4}$$

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

$$\cos^2 x = 1 - \sin^2 x$$

10) $$1 - \sin^2 x + \sin x = \frac{5}{4}$$

$$-1 + \sin^2 x - \sin x = -\frac{5}{4}$$

$$\sin^2 x - \sin x + \frac{1}{4} = 0$$

Put $y = \sin x$

$$y^2 - y + \frac{1}{4} = 0$$

$$y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(\frac{1}{4})}}{2(1)}$$

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

$$y = \frac{1 \pm 0}{2}$$

$$\boxed{y = \frac{1}{2} = \sin x}$$

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Q) If sin 25° = x/y, then sec 25° – sin 65° is equal to

(a) $\frac{x^2}{y\sqrt{y^2-x^2}}$

(b) $\frac{x}{y^2\sqrt{y^2-x^2}}$

(c) $\frac{x}{y\sqrt{y^2-x^2}}$

(d) $\frac{x^2}{y\sqrt{x^2-y^2}}$

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Ans. a

$\sin 25° = \frac{x}{y} \Rightarrow \sin^2 25° = \frac{x^2}{y^2}$

then $\sec 25° - \sin 65° = p$

$$p = \sec 25° - \sin 65°$$

$$= \frac{1}{\cos 25°} - \sin(90° - 25°)$$

$$= \frac{1}{\cos 25°} - \cos 25°$$

$$p = \frac{1 - (\cos 25°)^2}{\cos 25°} \quad \text{--- (1)}$$

From $\sin 25° = \frac{x}{y}$

4 $\sin^2 25° + \cos^2 25° = 1$

4 $\sin^2 25° + \cos^2 25° = 1$

$$\cos^2 25° = 1 - \sin^2 25°$$

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

$$\cos 25° = \sqrt{1 - \frac{x^2}{y^2}}$$

Put $\cos 25°$ & $\cos^2 25°$ in eq^n (1)

$$p = \frac{1 - \left(1 - \frac{x^2}{y^2}\right)}{\sqrt{1 - \frac{x^2}{y^2}}} = \frac{\frac{x^2}{y^2}}{\frac{\sqrt{y^2 - x^2}}{y}}$$

$$\boxed{p = \frac{x^2}{y\sqrt{y^2 - x^2}}}$$

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Q) Fins value of $\left(\frac{\sin 35^o}{\cos 55^o}\right)^2 + \left(\frac{\cos 55^o}{\sin 35^o}\right)^2 - 2\cos 30^0 = ?$

(a) $\sqrt{3}$

(b) $\sqrt{2}$

(c) $1 - \sqrt{3}$

(d) $2 - \sqrt{3}$

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Ans. d

$$k = \left(\frac{\sin 35^\circ}{\cos 55^\circ}\right)^2 + \left(\frac{\cos 55^\circ}{\sin 35^\circ}\right)^2 - 2\cos 30^\circ$$

$$k = \left(\frac{\sin 35^\circ}{\cos(90-35^\circ)}\right)^2 + \left(\frac{\cos 55^\circ}{\sin(90-55^\circ)}\right)^2 - 2\cos 30^\circ$$

$$= \left(\frac{\sin 35^\circ}{\sin 35^\circ}\right)^2 + \left(\frac{\cos 55^\circ}{\cos 55^\circ}\right)^2 - 2\cos 30^\circ$$

$$= 1^2 + 1^2 - 2\left(\frac{\sqrt{3}}{2}\right)$$

$$\boxed{k = 2 - \sqrt{3}}$$

Q) If $\cos^4\theta - \sin^4\theta = K$, then find the value of K?

(a) 1

(b) $2\cos^2\theta - 1$

(c) $2\sin^2\theta - 1$

(d) $1 - 2\cos^2\theta$

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Ans. b

$\cos^4\theta - \sin^4\theta = k$

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

$\left[\because\ a^2 - b^2 = (a-b)(a+b)\right.$

$\left.\text{i.e. } a^4 - b^4 = (a^2-b^2)(a^2+b^2)\right]$

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

$\cos^2\theta - (1 - \cos^2\theta) = k$

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

$\boxed{k = 2\cos^2\theta - 1}$

Q) If $a \sin\theta = \sqrt{3}\ and\ a\cos\theta = 1$, then the value of 'a' is:

(a) $\frac{1}{2}$

(b) $\sqrt{3}$

(c) 2

(d) -1

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Ans. c

$a \sin\theta = \sqrt{3} \Rightarrow \sin\theta = \frac{\sqrt{3}}{a}$

$a \cos\theta = 1 \Rightarrow \cos\theta = \frac{1}{a}$

$$\frac{\sin\theta}{\cos\theta} = \frac{\sqrt{3}/a}{1/a} = \sqrt{3}$$

$$\tan\theta = \sqrt{3}$$

$$\theta = 60^\circ$$

so; $a \sin\theta = \sqrt{3}$

$$\sin 60^\circ = \frac{\sqrt{3}}{a}$$

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

$$\boxed{a = 2}$$

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Q) What is the value of

$$\sin^2\theta + \cos^2\theta - \tan^2\theta - \cot^2\theta + \sec^2\theta + \text{cosec}^2\theta = ?$$

(a) 2

(b) 3

(c) 5

(d) 7

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Ans. b

)

$$K = \sin^2\theta + \cos^2\theta - \tan^2\theta - \cot^2\theta + \sec^2\theta + \operatorname{cosec}^2\theta$$

$$K = (\sin^2\theta + \cos^2\theta) + (\sec^2\theta - \tan^2\theta) + (\operatorname{cosec}^2\theta - \cot^2\theta)$$

$$K = 1 + 1 + 1$$

$$\boxed{K = 3}$$

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Q) $5\tan\theta = 4$, then the value of $\left(\frac{5\sin\theta - 3\cos\theta}{5\,Sin\theta + 3\cos\theta}\right) = ?$

(a) $\frac{1}{5}$

(b) $\frac{2}{7}$

(c) $\frac{2}{5}$

(d) $\frac{1}{7}$

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Ans. d

$5 \tan\theta = 4$

So, $\sin\theta = \frac{4}{\sqrt{41}}$

$\cos\theta = \frac{5}{\sqrt{41}}$

Now, $k = \frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 3\cos\theta}$

$k = \frac{5\left(\frac{4}{\sqrt{41}}\right) - 3\left(\frac{5}{\sqrt{41}}\right)}{5\left(\frac{4}{\sqrt{41}}\right) + 3\left(\frac{5}{\sqrt{41}}\right)}$

$k = \frac{20 - 15}{20 + 15}$

$k = \frac{5}{35} = \frac{1}{7}$

$\boxed{k = \frac{1}{7}}$

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Chalo Niklo