

Foundation Batch



MATHS

Trigonometry

Part -4

LIVE

04-11-2024 07:00PM





6. $\cos 570^\circ \sin 510^\circ + \sin(-330^\circ)(\cos 390^\circ) = ?$

(a) 2

(b) 0

(c) -1

(d) 1

$$\cos(360 + 210)$$

$$\cos 210^\circ$$

↓

$$\cos(180 + 30^\circ)$$

$$= -\cos 30^\circ$$

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

$$\sin(360 + 150)$$

$$\sin 150^\circ$$

$$\sin(180 - 30)$$

$$\sin 30^\circ$$

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

$$= \sin(360 - 30)$$

$$+ \sin 30^\circ$$

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

$$\cos(360 + 30)$$

$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\left[\frac{-\sqrt{3}}{2} \times \frac{1}{2} + \frac{1}{2} \times \frac{\sqrt{3}}{2} \right]$$

$$=$$

$$0$$

$$\underline{\underline{0}}$$

Radian (रेडियन)

$a^\circ = a \text{ Degree}$

$a^c = a \text{ radian}$

★ $1^c = 57.296^\circ$

$$\begin{aligned}\pi &= 3.14^c = 3.14 \times 57.296^\circ \\ &= 179.9 \approx 180^\circ\end{aligned}$$

$$\pi = 180^\circ$$

$$360^\circ = 2\pi$$

$$180^\circ = \pi$$

$$1^\circ = \frac{\pi}{180}^c$$

$$n^\circ = \left(\frac{\pi}{180} \times n \right)^c$$

$$90^\circ \rightarrow \frac{\pi}{180_2} \times 90 = \frac{\pi}{2}$$

$$45^\circ \rightarrow \frac{\pi}{180_4} \times 45 = \frac{\pi}{4}$$

$$30^\circ = \frac{\pi}{180} \times 30 = \frac{\pi}{6}$$

$$60^\circ = \frac{\pi}{180_3} \times 60 = \left(\frac{\pi}{3} \right)$$



7. Consider the following :

~~(I) $\sin 1^\circ > \sin 1^c$~~

~~(II) $\cos 1^\circ < \cos 1^c$~~

~~(III) $\tan 1^\circ > \tan 1^c$~~

$57.2961^c = 57.296^\circ$

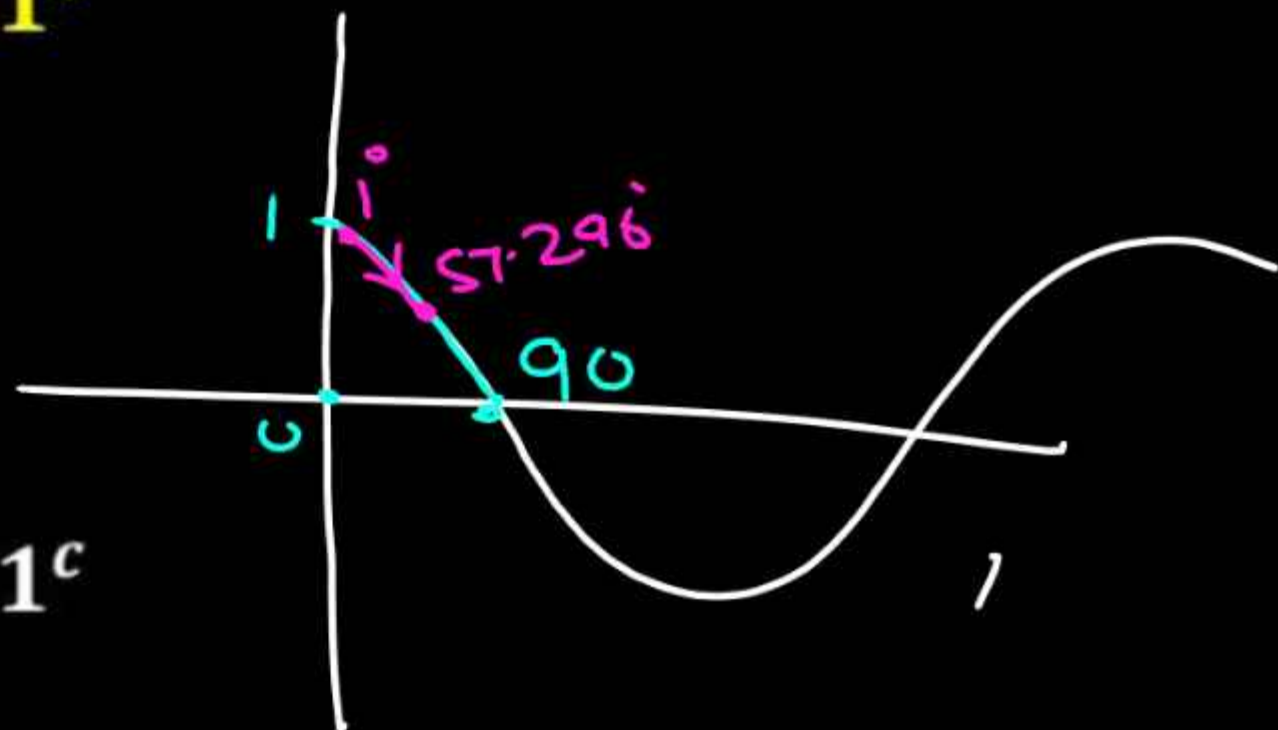
Which of the above are not correct?

निम्नलिखित पर विचार कीजिये:

(I) $\sin 1^\circ > \sin 1^c$

(II) $\cos 1^\circ < \cos 1^c$

(III) $\tan 1^\circ > \tan 1^c$



उपरोक्त में से कौन सा सही नहीं है।

(A) I and III only / केवल I और III (B) I and II only / केवल I और II

(C) II and III only / केवल II और III (D) I, II and III / I, II और III





8. cosec 2910° + sec 4260° + tan 2565° + cot 1755° = ?

(a) 3

(b) 1

☒ (c) 4

(d) 0

$$\text{Cosec}(360 \times 8 + 30) + \text{Sec}(360 \times 12 - 60)$$

$$\text{Cosec } 30^\circ + \text{Sec } 60^\circ$$

$$\text{Tan}(360 \times 7 + 45)$$

$$+ \text{Cot}(360 \times 5 - 45)$$

$$\text{tan } 45^\circ - \text{cot } 45^\circ$$

$$2 + 2 + 1 - 1$$

$$= 4$$

(SSC-CGL Pre. 20/07/2023)



9. If $\tan \theta_1 = 1$, $\sin \theta_2 = \frac{1}{\sqrt{2}}$ then the value of $\sin(\theta_1 + \theta_2)$ equal to :

यदि $\tan \theta_1 = 1$, $\sin \theta_2 = \frac{1}{\sqrt{2}}$ तो $\sin(\theta_1 + \theta_2)$ का मान किसके बराबर है?

(a) -1

(b) 0

(c) 1

(d) 1/2

$$\theta_1 = 45^\circ, \theta_2 = 45^\circ$$

$$\sin(45^\circ + 45^\circ)$$

$$\sin 90^\circ = 1$$



10. If $\tan(A + B) = \sqrt{3}$ & $\tan(A - B) = \frac{1}{\sqrt{3}}$, $0^\circ < (A + B) < 90^\circ$, $A > B$, then the values of A and B are....respectively.

यदि $\tan(A + B) = \sqrt{3}$ & $\tan(A - B) = \frac{1}{\sqrt{3}}$, $0^\circ < (A + B) < 90^\circ$, $A > B$, तो A और B के मान क्रमशः _____ है।

~~A. 30° & 30°~~

~~B. 60° & 30°~~

~~C. 15° & 45°~~

~~D. 45° & 15°~~

$$A + B = 60^\circ, \quad A - B = 30^\circ$$

$$A = \frac{90}{2} = 45^\circ, \quad B = \frac{30}{2} = 15^\circ$$



11. $\frac{4}{3} \cot^2 \frac{\pi}{6} + 3 \cos^2 150^\circ - 4 \operatorname{cosec}^2 45^\circ + 8 \sin \frac{\pi}{2} ?$

~~a. $\frac{25}{4}$~~ $\frac{4}{3} \times (\sqrt{3})^2 + 3 \cos^2 (180 - 30) - 4 \times (\sqrt{2})^2 + 8 \times 1$

~~b. $\frac{13}{2}$~~

~~c. -1~~ $\frac{4}{3} \times 3 + 3 \times \cos^2 30 - 4 \times 2 + 8$

~~d. $-\frac{7}{2}$~~

$4 + 3 \times \frac{3}{4} - 8 + 8$

$4 + \frac{9}{4} = \frac{25}{4}$



12. Find the value of $\cos 0^\circ + \cos 30^\circ - \tan 45^\circ + \operatorname{cosec} 60^\circ + \cot 90^\circ$.

$\cos 0^\circ + \cos 30^\circ - \tan 45^\circ + \operatorname{cosec} 60^\circ + \cot 90^\circ$ का मान ज्ञात कीजिए।

(a) $\frac{7}{6\sqrt{3}}$

(b) $\frac{\sqrt{3}}{6}$

(c) $\frac{7}{6}$

(d) $\frac{7}{2\sqrt{3}}$

$$1 + \frac{\sqrt{3}}{2} - 1 + \frac{2}{\sqrt{3}} + 0$$

$$\frac{3+4}{2\sqrt{3}} = \frac{7}{2\sqrt{3}}$$

$$\frac{\cos 90^\circ}{\sin 90^\circ} = \frac{0}{1} = 0$$



13. The value of $\frac{\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$

$\frac{\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$ का मान है

(a) $\frac{64}{\sqrt{3}}$

(b) $\frac{55}{12}$

(c) $\frac{67}{12}$

(d) $\frac{67}{10}$

$$\left(\frac{1}{2}\right)^2 + 4 \times \left(\frac{2}{\sqrt{3}}\right)^2 - 1$$

$$\frac{1}{4} + 4 \times \frac{4}{3} - 1$$

$$= \frac{1}{4} + \frac{16}{3} - 1 \Rightarrow \frac{67}{12} - 1 \Rightarrow \frac{55}{12}$$

$$\Rightarrow \frac{67}{12} - 1 \Rightarrow \frac{55}{12}$$

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



14. If $A = \frac{\sin 45^\circ - \sin 30^\circ}{\cos 45^\circ + \cos 60^\circ}$ and $B = \frac{\sec 45^\circ - \tan 45^\circ}{\operatorname{cosec} 45^\circ + \cot 45^\circ}$, then

which one of the following is correct?

यदि $A = \frac{\sin 45^\circ - \sin 30^\circ}{\cos 45^\circ + \cos 60^\circ}$ और $B = \frac{\sec 45^\circ - \tan 45^\circ}{\operatorname{cosec} 45^\circ + \cot 45^\circ}$ तो

निम्नलिखित में से कौन सा सही है?

~~(A) $A = B$~~

(B) $A > B > 0$

(C) $A < B$

(D) $B < A < 0$

$$A = \frac{\frac{1}{\sqrt{2}} - \frac{1}{2}}{\frac{1}{\sqrt{2}} + \frac{1}{2}}$$

$$\frac{2 - \sqrt{2}}{2 + \sqrt{2}} \times \frac{2 - \sqrt{2}}{2 - \sqrt{2}}$$

$$= \frac{(2 - \sqrt{2})^2}{4 - 2} = \frac{4 + 2 - 4\sqrt{2}}{2} = \frac{6 - 4\sqrt{2}}{2} = 3 - 2\sqrt{2}$$

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



15. Value of the expression

$$\frac{1+2\sin 60^\circ \cos 60^\circ}{\sin 60^\circ + \cos 60^\circ} + \frac{1-2\sin 60^\circ \cos 60^\circ}{\sin 60^\circ - \cos 60^\circ} \text{ is}$$

$$\frac{1+2\sin 60^\circ \cos 60^\circ}{\sin 60^\circ + \cos 60^\circ} + \frac{1-2\sin 60^\circ \cos 60^\circ}{\sin 60^\circ - \cos 60^\circ} \text{ व्यंजक का मान है।}$$

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

$$(b) 2\sqrt{3}$$

$$(c) 0$$

$$(d) 2$$

$$\frac{\sin^2 60^\circ + \cos^2 60^\circ + 2\sin 60^\circ \cos 60^\circ}{\sin 60^\circ + \cos 60^\circ}$$

$$\frac{(\sin 60^\circ + \cos 60^\circ)^2}{(\sin 60^\circ + \cos 60^\circ)} + \frac{(\sin 60^\circ - \cos 60^\circ)^2}{\sin 60^\circ - \cos 60^\circ}$$

$$\sin 60^\circ + \cos 60^\circ + \sin 60^\circ - \cos 60^\circ = 2\sin 60^\circ$$

2x 13

13



16. The value of $\frac{4\tan^2 30^\circ + \frac{1}{4}\sin^2 90^\circ + \frac{1}{8}\cot^2 60^\circ + \sin^2 30^\circ \cos^2 45^\circ}{\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ}$ is

$\frac{4\tan^2 30^\circ + \frac{1}{4}\sin^2 90^\circ + \frac{1}{8}\cot^2 60^\circ + \sin^2 30^\circ \cos^2 45^\circ}{\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ}$ का मान है:

a. $1\frac{3}{4}$

b. 4

c. $2\frac{1}{2}$

d. $3\frac{1}{2}$

$$4 \times \left(\frac{1}{\sqrt{3}}\right)^2 + \frac{1}{4} \times 1 + \frac{1}{8} \times \left(\frac{1}{\sqrt{3}}\right)^2 + \frac{1}{4} \times \frac{1}{2}$$

$$\frac{\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} - \frac{1}{2} \times \frac{1}{2}}$$

$$\Rightarrow 4 \times \frac{1}{3} + \frac{1}{4} + \frac{1}{8} \times \frac{1}{3} + \frac{1}{8}$$

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

$$\frac{\frac{4}{3} + \frac{1}{4} + \frac{1}{24} + \frac{1}{8}}{\left(\frac{1}{2}\right)}$$

$$\frac{(32+6+1+3) \times 2}{24}$$

$$\frac{42}{12} = \frac{7}{2}$$

$$\frac{7}{2} = 3\frac{1}{2}$$



17. The value of $\frac{\operatorname{cosec}^2 30^\circ \sin^2 45^\circ + \sec^2 60^\circ}{\tan 60^\circ \operatorname{cosec}^2 45^\circ - \sec^2 60^\circ \tan 45^\circ}$ is

$\frac{\operatorname{cosec}^2 30^\circ \sin^2 45^\circ + \sec^2 60^\circ}{\tan 60^\circ \operatorname{cosec}^2 45^\circ - \sec^2 60^\circ \tan 45^\circ}$ का मान ज्ञात कीजिए।

(a) $3(2 + \sqrt{3})$

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

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

✓ (d) $-3(2 + \sqrt{3})$

$$(2)^2 \times \left(\frac{1}{\sqrt{2}}\right)^2 + (2)^2$$

$$\frac{\sqrt{3} \times (\sqrt{2})^2 - (2)^2 \times 1}{}$$

$$= \frac{4 \times \frac{1}{2} + 4}{2\sqrt{3} - 4}$$

$$\Rightarrow \frac{6}{2\sqrt{3} - 4} \Rightarrow \frac{3\sqrt{3}}{\sqrt{3} - 2}$$

$$\frac{3}{\sqrt{3} - 2} \times \frac{\sqrt{3} + 2}{\sqrt{3} + 2}$$

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

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



18. Consider the following statements:

निम्नलिखित कथनों पर विचार करें:

1. The first quadrant contains only one value of x which satisfies $\sin x + \cos x = 2$. $0^\circ < \theta < 90^\circ$ $\sin x + \cos x = 2$

प्रथम चतुर्थांश में x का केवल वही मान है जो $\sin x + \cos x = 2$ को संतुष्ट करता है।

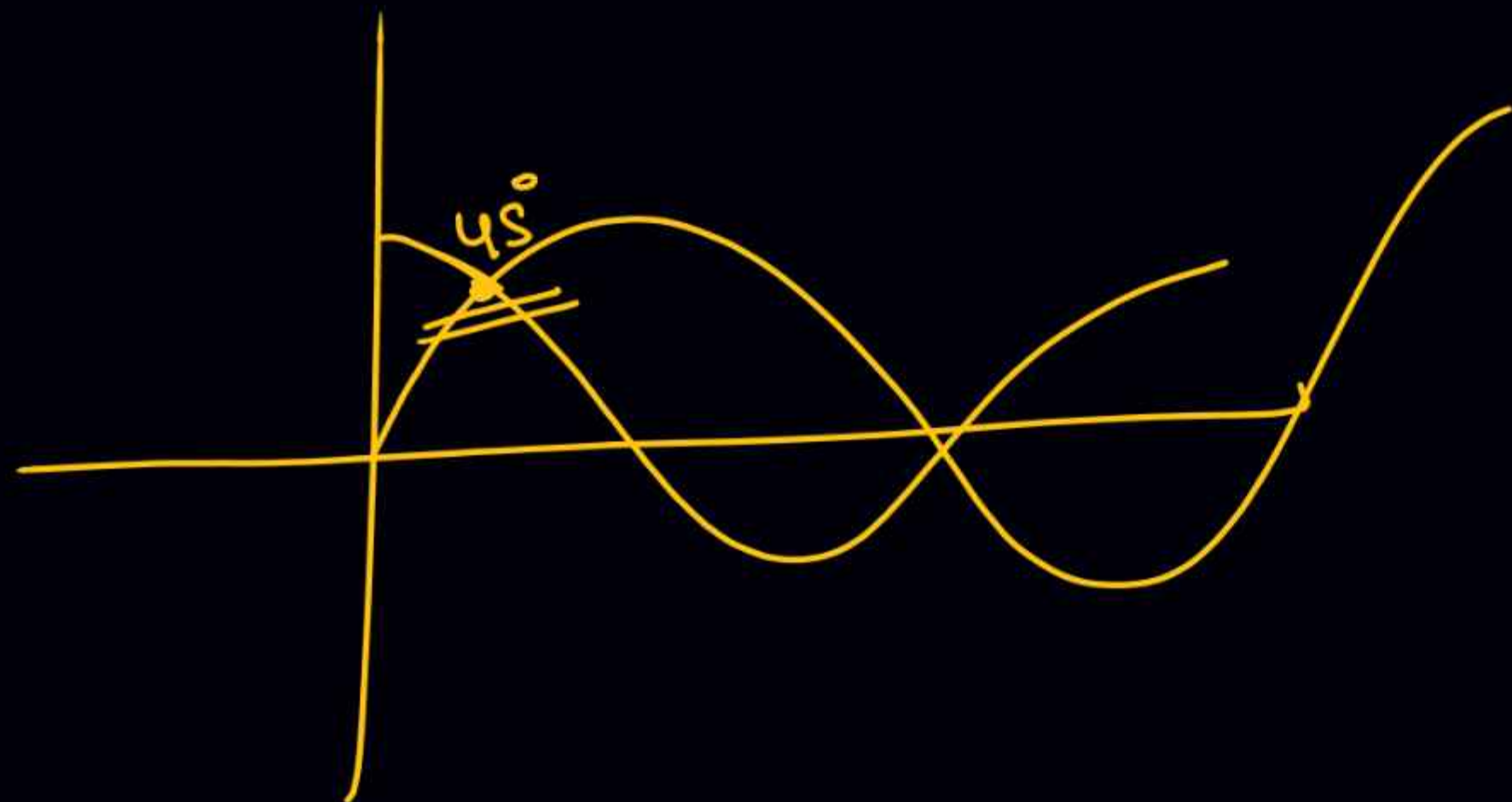
2. The first quadrant contains only one value of x which satisfies $\sin x - \cos x = 0$. $\sin - \cos x = 0 \Rightarrow \sin x = \cos x$

प्रथम चतुर्थांश में x का केवल एक मान है जो $\sin x - \cos x = 0$ को संतुष्ट करता है।
उपरोक्त में से कौन-सा/से सही है/हैं?

$$x = 45^\circ \Rightarrow \sin x = \cos x$$

Which of the above is/are correct?

(A) 1 only (B) 2 only (C) Both 1 and 2 (D) Neither 1 nor 2





20. The value of $32\cot^2\frac{\pi}{4} - 8\sec^2\frac{\pi}{3} + 8\cos^3\frac{\pi}{6}$ is equal to

$32\cot^2\left(\frac{\pi}{4}\right)^{45} - 8\sec^2\left(\frac{\pi}{3}\right)^{60} + 8\cos^3\left(\frac{\pi}{6}\right)^{30}$ का मान बराबर है

(A) $\sqrt{3}$

(B) $2\sqrt{3}$ $32 \times 1 - 8 \times (2)^2 + 8 \times \left(\frac{\sqrt{3}}{2}\right)^3$

(C) 3

(D) $3\sqrt{3}$

$$32 - 32 + 8 \times \frac{3\sqrt{3}}{8}$$

$$= 3\sqrt{3}$$



21. If $A = \frac{\pi}{6}$ and $B = \frac{\pi}{3}$, then which of the following is/are correct ? ^{30°}

यदि $A = \frac{\pi}{6}$ और $B = \frac{\pi}{3}$, तो निम्नलिखित में से कौनसा/से सही है/हैं? ^{60°}

I. $\sin A + \sin B = \cos A + \cos B \Rightarrow \sin 30 + \sin 60 = \cos 30 + \cos 60$

II. $\tan A + \tan B = \cot A + \cot B \Rightarrow \tan 30 + \tan 60 = \cot 30 + \cot 60$

Select the correct answer using the code given below:

नीचे दिए गए कूट का प्रयोग कर सही उत्तर चुनिए:

(A) 1 only

(B) 2 only

(C) Both 1 and 2

(D) Neither 1 nor 2



24. If $\cos \theta \geq \frac{1}{2}$ in the first quadrant, then which one of the following is correct?

यदि पहले चतुर्थांश में $\cos \theta \geq \frac{1}{2}$ हो, तो निम्नलिखित में से कौन सा सही है?

(A) $\theta \leq \frac{\pi}{3}$

(B) $\theta \geq \frac{\pi}{3}$

(C) $\theta \leq \frac{\pi}{6}$

(D) $\theta \geq \frac{\pi}{6}$

$\cos \theta \geq \frac{1}{2}$

$\theta \geq 60^\circ$

$\theta \geq \frac{\pi}{3}$

$90^\circ > \theta > 0^\circ$

Ist Quadrant



H.W **19.** If $\frac{\cos^2 \theta - 3\cos \theta + 2}{\sin^2 \theta} = 1$, where $0 < \theta < \frac{\pi}{2}$, then which of the following statements is/are correct?

1. There are two values of θ satisfying the above equations.

2. $\theta = 60^\circ$ is satisfied the above equation.

Select the correct answer using the code given below.

a. 1 only

b. 2 only

c. Both 1 and 2

d. Neither 1 nor 2



यदि $\frac{\cos^2 \theta - 3\cos \theta + 2}{\sin^2 \theta} = 1$, जहां $0 < \theta < \frac{\pi}{2}$, तो निम्नलिखित में से कौन सा/से कथन सही है/हैं?

1. उपरोक्त समीकरणों को संतुष्ट करने वाले θ के दो मान हैं।

2. $\theta = 60^\circ$ उपरोक्त समीकरण से संतुष्ट है।

नीचे दिए गए कूट का प्रयोग कर सही उत्तर चुनिए।

(A) केवल 1

(B) केवल 2

(C) दोनों 1 और 2

(D) न तो 1 और न ही 2