

NDA 1 2025

LIVE

MATHS

TRIGONOMETRY - 2

MCQS



NAVJYOTI SIR

Crack
EXAMS



24 Jan 2025 Live Classes Schedule

9:00AM	24 JANUARY 2025 DAILY DEFENCE UPDATES	DIVYANSHU SIR
10:00AM	24 JANUARY 2025 DAILY CURRENT AFFAIRS	RUBY MA'AM

AFCAT 1 2025 LIVE CLASSES

✓ 12:30PM	REASONING - FIGURE ANALOGY	RUBY MA'AM
✓ 3:00PM	STATIC GK - SPORTS	DIVYANSHU SIR
✓ 5:30PM	MATHS - TIME & WORK	NAVJYOTI SIR

NDA 1 2025 LIVE CLASSES

✓ 10:00AM	MATHS - TRIGONOMETRY - CLASS 2	NAVJYOTI SIR
✓ 11:30AM	MEDIEVAL HISTORY - CLASS 2	RUBY MA'AM
✓ 1:00PM	PHYSICS - HUMAN EYE & THE COLOURFUL WORLD	NAVJYOTI SIR

CDS 1 2025 LIVE CLASSES

✓ 11:30AM	MEDIEVAL HISTORY - CLASS 2	RUBY MA'AM
✓ 1:00PM	PHYSICS - HUMAN EYE & THE COLOURFUL WORLD	NAVJYOTI SIR
✓ 5:30PM	MATHS - TIME & WORK	NAVJYOTI SIR

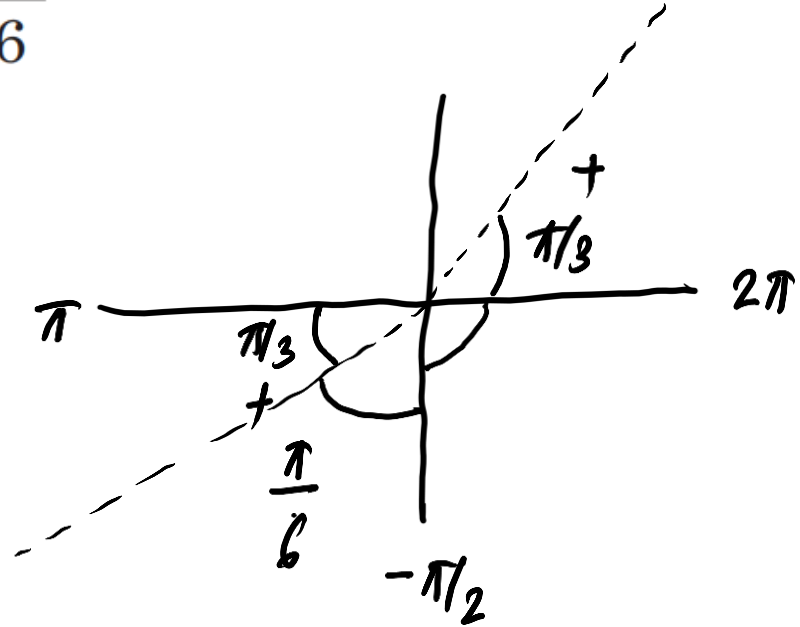


Q) If $\sin \theta = \sqrt{3} \cos \theta$, $-\pi < \theta < 0$, then θ is equal to

- (a) $\frac{-5\pi}{6}$ (b) $\frac{-4\pi}{6}$ (c) $\frac{4\pi}{6}$ (d) $\frac{5\pi}{6}$

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

$$\theta = \frac{\pi}{3} \text{ or } \pi + \frac{\pi}{3}$$



$$\frac{-\pi}{2} + \left(-\frac{\pi}{6}\right) = \frac{-3\pi - \pi}{6} = \frac{-4\pi}{6}$$

Q) If $\sin \theta = \sqrt{3} \cos \theta$, $-\pi < \theta < 0$, then θ is equal to

- (a) $\frac{-5\pi}{6}$ (b) $\frac{-4\pi}{6}$ (c) $\frac{4\pi}{6}$ (d) $\frac{5\pi}{6}$

Ans: (b)

Q) $\cot^{-1} \left[\frac{\sqrt{1 - \sin x} + \sqrt{1 + \sin x}}{\sqrt{1 - \sin x} - \sqrt{1 + \sin x}} \right]$ is equal to

- (a) $\pi - x$ (b) $2\pi - x$
 (c) $\frac{x}{2}$ (d) $\pi - \frac{x}{2}$

$$= \frac{\sqrt{1 - \sin x} + \sqrt{1 + \sin x}}{\sqrt{1 - \sin x} - \sqrt{1 + \sin x}} \times \frac{\sqrt{1 - \sin x} + \sqrt{1 + \sin x}}{\sqrt{1 - \sin x} + \sqrt{1 + \sin x}}$$

$$= \frac{(\sqrt{1 - \sin x} + \sqrt{1 + \sin x})^2}{(\sqrt{1 - \sin x})^2 - (\sqrt{1 + \sin x})^2} = \frac{(1 - \sin x) + (1 + \sin x) + 2\sqrt{(1 + \sin x)(1 - \sin x)}}{1 - \sin x - 1 - \sin x}$$

$$\frac{(1 - \sin x) + (1 + \sin x) + 2\sqrt{(1 + \sin x)(1 - \sin x)}}{1 - \sin x - 1 - \sin x}$$

$$1 - \sin x - 1 - \sin x$$

$$= \frac{2 + 2\sqrt{1 - \sin^2 x}}{-2\sin x} = \frac{2 + 2\cos x}{-2\sin x} = \frac{1 + \cos x}{-\sin x} = - \left[\frac{1 + \cos x}{\sin x} \right]$$

$$= - \left[\frac{2\cos^2 x/2}{2\sin x/2 \cos x/2} \right] = - \left[\cot x/2 \right]$$

$$\cos \theta = 2\cos^2 \frac{\theta}{2} - 1$$

$$\sin \theta = 2\sin \frac{\theta}{2} \cos \frac{\theta}{2}$$

$$\cot^{-1} \left[-\cot \frac{x}{2} \right]$$

$$\cot^{-1}(x) = \pi - \cot^{-1}(x)$$

$$\pi - \cot^{-1} \left(\cot \frac{x}{2} \right)$$

$$= \pi - \frac{x}{2}$$

Q) $\cot^{-1} \left[\frac{\sqrt{1 - \sin x} + \sqrt{1 + \sin x}}{\sqrt{1 - \sin x} - \sqrt{1 + \sin x}} \right]$ is equal to

(a) $\pi - x$

(b) $2\pi - x$

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

(d) $\pi - \frac{x}{2}$

Ans: (d)

NDA 1 2025 LIVE CLASS - MATHS - PART 2

If $4 \sin^{-1} x + \cos^{-1} x = \pi$, then what is $\sin^{-1} x + 4 \cos^{-1} x$ equal to? (PYQ - 2024 - II)

(a) $\pi/2$

(b) π

(c) $3\pi/2$

(d) 2π

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

$$3 \sin^{-1} x = \pi - \frac{\pi}{2}$$

$$\sin^{-1} x = \frac{\pi}{6}$$

$$x = \sin \frac{\pi}{6} = \frac{1}{2}$$

$$\left(\sin^{-1} x + \cos^{-1} x = \frac{\pi}{2} \right)$$

$$\sin^{-1} \left(\frac{1}{2} \right) + 4 \cos^{-1} \left(\frac{1}{2} \right)$$

$$\frac{\pi}{6} + 4 \left(\frac{\pi}{3} \right)$$

$$\frac{\pi + 8\pi}{6} = \frac{9\pi}{6} = \frac{3\pi}{2}$$

NDA 1 2025 LIVE CLASS - MATHS - PART 2

. If $4 \sin^{-1} x + \cos^{-1} x = \pi$, then what is $(\text{PYQ} - 2024 - \text{II})$
 $\sin^{-1} x + 4 \cos^{-1} x$ equal to?

(a) $\pi / 2$

(b) π

(c) $3\pi / 2$

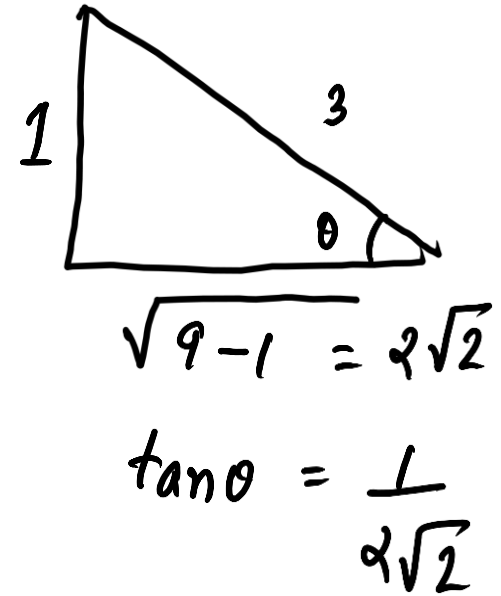
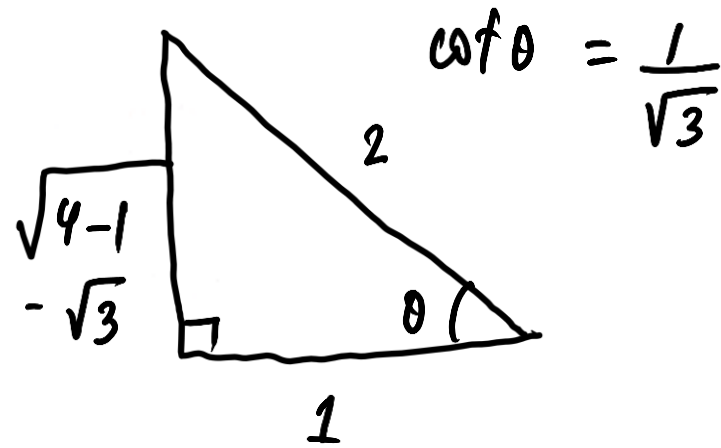
(d) 2π

Ans: (c)

NDA 1 2025 LIVE CLASS - MATHS - PART 2

What is $\cot^2(\sec^{-1} 2) + \tan^2(\operatorname{cosec}^{-1} 3)$ (PYQ - 2024 - II) equal to?

- (a) 11/12
- (b) 11/24
- (c) 7/24
- (d) 1/24



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

$$\sin^2 \theta = \underline{\underline{(\sin \theta)^2}}$$

$$\left(\frac{1}{\sqrt{3}} \right)^2 + \left(\frac{1}{2\sqrt{2}} \right)^2 = \frac{1}{3} + \frac{1}{8} = \frac{11}{24} //$$

NDA 1 2025 LIVE CLASS - MATHS - PART 2

What is $\cot^2(\sec^{-1} 2) + \tan^2(\operatorname{cosec}^{-1} 3)$ (PYQ – 2024 – II)
equal to?

(a) $11/12$

(b) $11/24$

(c) $7/24$

(d) $1/24$

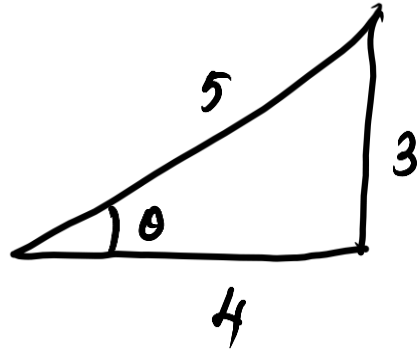
Ans: (b)

Q) What is the value of the following?

$$\cot \left[\sin^{-1} \left(\frac{3}{5} \right) + \cot^{-1} \left(\frac{3}{2} \right) \right] =$$

- (a) $\frac{6}{17}$
 (c) $\frac{16}{7}$

- (b) $\frac{7}{16}$
 (d) $\frac{17}{6}$



$$\left(\tan^{-1} \left(\frac{3}{4} \right) + \tan^{-1} \left(\frac{2}{3} \right) \right) = \tan^{-1} \left(\frac{\frac{3}{4} + \frac{2}{3}}{1 - \frac{3}{4} \times \frac{2}{3}} \right) = \tan^{-1} \left(\frac{17}{6} \right)$$

$$\frac{1}{\tan \left[\sin^{-1} \left(\frac{3}{5} \right) + \cot^{-1} \left(\frac{3}{2} \right) \right]}$$

\downarrow $\tan^{-1} \left(\frac{3}{4} \right)$ \downarrow $\tan^{-1} \left(\frac{2}{3} \right)$

$\cot^{-1} x = \tan^{-1} \left(\frac{1}{x} \right)$

$$\tan \left(\tan^{-1} \left(\frac{17}{6} \right) \right) = \frac{17}{6}$$

$$\frac{1}{\left(\frac{17}{6} \right)} = \frac{6}{17}$$

Q) What is the value of the following?

$$\cot \left[\sin^{-1} \left(\frac{3}{5} \right) + \cot^{-1} \left(\frac{3}{2} \right) \right]$$

(a) $\frac{6}{17}$

(b) $\frac{7}{16}$

(c) $\frac{16}{7}$

(d) $\frac{17}{6}$

Ans: (a)

If

(PYQ – 2024 – II)

$$\frac{x}{\cos \theta} = \frac{y}{\cos\left(\frac{2\pi}{3} - \theta\right)} = \frac{z}{\cos\left(\frac{2\pi}{3} + \theta\right)}$$

then what is $x + y + z$ equal to?

(a) -1

Let $\theta = 60^\circ$

(b) 0

(c) 1

$$\frac{x}{\cos 60^\circ} = \frac{y}{\cos(120^\circ - 60^\circ)} = \frac{z}{\cos(120^\circ + 60^\circ)} = k$$

(d) 3

$$\left. \begin{aligned} \frac{x}{\frac{1}{2}} = \frac{y}{\frac{1}{2}} = \frac{z}{-1} = k \end{aligned} \right\} \begin{aligned} x &= \frac{1}{2}k \\ y &= \frac{1}{2}k \end{aligned} \quad \text{and } z = -k$$

$$x + y + z = \frac{1}{2}k + \frac{1}{2}k - k = k - k = 0$$

NDA 1 2025 LIVE CLASS - MATHS - PART 2

If

$$\frac{x}{\cos\theta} = \frac{y}{\cos\left(\frac{2\pi}{3} - \theta\right)} = \frac{z}{\cos\left(\frac{2\pi}{3} + \theta\right)}$$

then what is $x + y + z$ equal to?

- (a) -1
- (b) 0
- (c) 1
- (d) 3

Ans: (b)

NDA 1 2025 LIVE CLASS - MATHS - PART 2

If $p \tan(\theta - 30^\circ) = q \tan(\theta + 120^\circ)$, then (PYQ - 2024 - II)
what is $(p + q) / (p - q)$ equal to?

(a) $\sin 2\theta$

(b) $\cos 2\theta$

(c) $2\sin 2\theta$

(d) $2\cos 2\theta$ ✓

$$\frac{p+q}{p-q} \left(\frac{p}{q} \right)$$

$$\frac{p}{q} = \frac{\tan(\theta + 120^\circ)}{\tan(\theta - 30^\circ)}$$

Let $\theta = 60^\circ$

$$\frac{p}{q} = \frac{\tan(60^\circ + 120^\circ)}{\tan(60^\circ - 30^\circ)} = \frac{\tan 180^\circ}{\tan 30^\circ} = \frac{0}{\frac{1}{\sqrt{3}}}$$

$$\frac{p+q}{p-q} = \frac{0 + \frac{1}{\sqrt{3}}}{0 - \frac{1}{\sqrt{3}}} = \frac{\frac{1}{\sqrt{3}}}{-\frac{1}{\sqrt{3}}} = -1$$

$$\theta = 30^\circ$$

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

$$\Rightarrow \frac{-\frac{1}{\sqrt{3}}}{-\frac{1}{\sqrt{3}}} = 1$$

NDA 1 2025 LIVE CLASS - MATHS - PART 2

If $p \tan(\theta - 30^\circ) = q \tan(\theta + 120^\circ)$, then what is $(p + q) / (p - q)$ equal to?

- (a) $\sin 2\theta$
- (b) $\cos 2\theta$
- (c) $2\sin 2\theta$
- (d) $2\cos 2\theta$

Ans: (d)

Q) If $7 \sin \theta + 24 \cos \theta = 25$, then what is the value of $(\sin \theta + \cos \theta)$?

- (a) 1 (b) $\frac{26}{25}$ (c) $\frac{6}{5}$ (d) $\frac{31}{25}$

$$7 \left(\frac{7}{25} \right) + 24 \left(\frac{24}{25} \right) = \frac{25^2}{25} = \underline{25}$$

$$\sin \theta = \frac{7}{25}$$

$$\cos \theta = \frac{24}{25}$$

$$7^2 + 24^2 = 25^2$$

(pythagorean triplet)

$$\begin{aligned} \sin \theta + \cos \theta \\ \frac{7}{25} + \frac{24}{25} = \frac{31}{25} \end{aligned}$$

Q) If $7 \sin \theta + 24 \cos \theta = 25$, then what is the value of $(\sin \theta + \cos \theta)$?

- (a) 1 (b) $\frac{26}{25}$ (c) $\frac{6}{5}$ (d) $\frac{31}{25}$

Ans: (d)

Q) If $A + B = \frac{\pi}{2}$, what are the greatest and the least values of $\cos A \cos B$, respectively?

- (a) $1/2$ and 0 (b) 0 and $-1/2$
 (c) $1/2$ and $-1/2$ (d) 0 and -1

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

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

for $\sin 2A$,

greatest value = 1

least value = -1

(Greatest value)

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

$$\frac{1}{2} \times -1 = -\frac{1}{2} \text{ (Least value)}$$

Q) If $A + B = \frac{\pi}{2}$, what are the greatest and the least

values of $\cos A \cos B$, respectively?

- (a) $1/2$ and 0 (b) 0 and $-1/2$
(c) $1/2$ and $-1/2$ (d) 0 and -1

Ans: (c)

Q) If $\alpha + \beta = \frac{\pi}{2}$ and $\beta + \gamma = \alpha$, then which one of the following is correct?

- (a) $2 \tan \beta + \tan \gamma = \tan \alpha$ (b) $\tan \beta + 2 \tan \gamma = \tan \alpha$
 (c) $\tan \beta + \tan \gamma = \tan \alpha$ (d) $2(\tan \beta + \tan \gamma) = \tan \alpha$

$$\beta + \gamma = \alpha$$

$$\tan(\beta + \gamma) = \tan \alpha$$

$$\frac{\tan \beta + \tan \gamma}{1 - \tan \beta \tan \gamma} = \tan \alpha$$

$$\begin{aligned} \tan \beta + \tan \gamma &= \tan \alpha - \tan \alpha \tan \beta \tan \gamma \\ \text{"} \quad \text{"} \quad \text{"} &- \tan \alpha \left(\tan \left(\frac{\pi}{2} - \alpha \right) \right) \tan \gamma \end{aligned}$$

$$\tan \beta + 2 \tan \gamma = \tan \alpha$$

Q) If $\alpha + \beta = \frac{\pi}{2}$ and $\beta + \gamma = \alpha$, then which one of the following is correct?

- (a) $2 \tan \beta + \tan \gamma = \tan \alpha$ (b) $\tan \beta + 2 \tan \gamma = \tan \alpha$
(c) $\tan \beta + \tan \gamma = \tan \alpha$ (d) $2 (\tan \beta + \tan \gamma) = \tan \alpha$

Ans: (b)

Q) What is the value of $\tan 15^\circ \cdot \tan 195^\circ$?

(a) $7 - 4\sqrt{3}$

(b) $7 + 4\sqrt{3}$

(c) $7 + 2\sqrt{3}$

(d) $7 + 6\sqrt{3}$

$\tan^2 15^\circ$

$\tan(45^\circ - 30^\circ) = \underline{\tan 15^\circ}$

$$\frac{\tan 45^\circ - \tan 30^\circ}{1 + \tan 45^\circ \tan 30^\circ} = \frac{1 - \frac{1}{\sqrt{3}}}{1 + \frac{1}{\sqrt{3}}} = \frac{\sqrt{3} - 1}{\sqrt{3} + 1}$$

$\tan 195^\circ = \tan(180^\circ + 15^\circ)$

$= \underline{\tan 15^\circ}$

$$\tan^2 15^\circ = \left(\frac{\sqrt{3} - 1}{\sqrt{3} + 1} \right)^2 = \frac{3 + 1 - 2\sqrt{3}}{3 + 1 + 2\sqrt{3}} = \frac{4 - 2\sqrt{3}}{4 + 2\sqrt{3}}$$

$$\frac{4 - 2\sqrt{3}}{4 + 2\sqrt{3}} \times \frac{4 - 2\sqrt{3}}{4 - 2\sqrt{3}} = \frac{16 + 12 - 16\sqrt{3}}{16 - 12} = \frac{28 - 16\sqrt{3}}{4}$$
$$= \underline{\underline{7 - 4\sqrt{3}}}$$

Q) What is the value of $\tan 15^\circ \cdot \tan 195^\circ$?

(a) $7 - 4\sqrt{3}$

(b) $7 + 4\sqrt{3}$

(c) $7 + 2\sqrt{3}$

(d) $7 + 6\sqrt{3}$

Ans: (a)

Q) If $\cos \theta = \frac{1}{2} \left(x + \frac{1}{x} \right)$, then $\frac{1}{2} \left(x^2 + \frac{1}{x^2} \right)$ is equal to

(a) $\sin 2\theta$

(b) $\cos 2\theta$

(c) $\tan 2\theta$

(d) $\sec 2\theta$

Q) If $\cos \theta = \frac{1}{2} \left(x + \frac{1}{x} \right)$, then $\frac{1}{2} \left(x^2 + \frac{1}{x^2} \right)$ is equal to

(a) $\sin 2\theta$

(b) $\cos 2\theta$

(c) $\tan 2\theta$

(d) $\sec 2\theta$

Ans: (b)

Q) Let $0 < x < \frac{\pi}{4}$ then $(\sec 2x - \tan 2x)$ equals

(a) $\tan\left(x - \frac{\pi}{4}\right)$

(b) $\tan\left(\frac{\pi}{4} - x\right)$

(c) $\tan\left(x + \frac{\pi}{4}\right)$

(d) $\tan^2\left(x + \frac{\pi}{4}\right)$

Q) Let $0 < x < \frac{\pi}{4}$ then $(\sec 2x - \tan 2x)$ equals

(a) $\tan\left(x - \frac{\pi}{4}\right)$

(b) $\tan\left(\frac{\pi}{4} - x\right)$

(c) $\tan\left(x + \frac{\pi}{4}\right)$

(d) $\tan^2\left(x + \frac{\pi}{4}\right)$

Ans: (b)

Q) What is the value of :

$$\cos \left[\tan^{-1} \left\{ \tan \left(\frac{15\pi}{4} \right) \right\} \right] ?$$

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

(b) 0

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

(d) $\frac{1}{2\sqrt{2}}$

Q) What is the value of :

$$\cos \left[\tan^{-1} \left\{ \tan \left(\frac{15\pi}{4} \right) \right\} \right] ?$$

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

(b) 0

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

(d) $\frac{1}{2\sqrt{2}}$

Ans: (c)

Q) What is the value of $\tan\left(7\frac{1}{2}\right)^\circ$?

(a) $\sqrt{6} + \sqrt{3} - \sqrt{2} + 2$

(b) $\sqrt{6} + \sqrt{3} + \sqrt{2} + 2$

(c) $\sqrt{6} - \sqrt{3} + \sqrt{2} - 2$

(d) $\sqrt{6} + \sqrt{3} + \sqrt{2} - 2$

Q) What is the value of $\tan\left(7\frac{1}{2}\right)^\circ$?

(a) $\sqrt{6} + \sqrt{3} - \sqrt{2} + 2$

(b) $\sqrt{6} + \sqrt{3} + \sqrt{2} + 2$

(c) $\sqrt{6} - \sqrt{3} + \sqrt{2} - 2$

(d) $\sqrt{6} + \sqrt{3} + \sqrt{2} - 2$

Ans: (c)

Q) The value of $\sin 36^\circ \sin 72^\circ \sin 108^\circ \sin 144^\circ$ is equal to

(a) $1/4$ (b) $1/16$ (c) $3/4$ (d) $5/16$

Q) The value of $\sin 36^\circ \sin 72^\circ \sin 108^\circ \sin 144^\circ$ is equal to

(a) $1/4$ (b) $1/16$ (c) $3/4$ (d) $5/16$

Ans: (d)

Q) If $\cos \theta + \sec \theta = k$, then what is the value of $\sin^2 \theta - \tan^2 \theta$?

- (a) $4 - k$ (b) $4 - k^2$ (c) $k^2 - 4$ (d) $k^2 + 2$

Q) If $\cos \theta + \sec \theta = k$, then what is the value of $\sin^2 \theta - \tan^2 \theta$?

- (a) $4 - k$ (b) $4 - k^2$ (c) $k^2 - 4$ (d) $k^2 + 2$

Ans: (b)

Q) If the sides of a triangle are 6cm, 10cm and 14 cm, then what is the largest angle included by the sides?

- (a) 90° (b) 120°
(c) 135° (d) 150°

Q) If the sides of a triangle are 6cm, 10cm and 14 cm, then what is the largest angle included by the sides?

- (a) 90° (b) 120°
(c) 135° (d) 150°

Ans: (b)

NDA 1 2025

LIVE

MATHS

COMPLEX NUMBERS

MCQS



NAVJYOTI SIR



Crack
EXAMS