CDS 1 2025

LIVE

MATHS

TRIGONOMETRY

CLASS 5

NAVJYOTI SIR

03 Dec 2024 Live Classes Schedule

9:00AM	03 DEC 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

9:30AM	ONLINE COURSE INTRO	ANURADHA MA'AM

NDA 1 2025 LIVE CLASSES

1:00PM	PHYSICS - REFRACTION OF LIGHT - CLASS 2	NAVJYOTI SIR
4:30PM	ENGLISH - ADAPTATION OF BORROWED WORDS - CLASS 1	ANURADHA MA'AM
5:30PM	MATHS - LIMITS & CONTINUITY - CLASS 4	NAVJYOTI SIR

CDS 1 2025 LIVE CLASSES

1:00PM	PHYSICS - REFRACTION OF LIGHT - CLASS 2	NAVJYOTI SIR
4:30PM	ENGLISH - ADAPTATION OF BORROWED WORDS - CLASS 1	ANURADHA MA'AM
7:00PM	MATHS - TRIGONOMETRY - CLASS 5	NAVJYOTI SIR

PYQ – 24 – I

If $3 \sin \theta + 5 \cos \theta = 5$, then what is the value of $5 \sin \theta - 3 \cos \theta$?

(a) -3

(b) -2

(c) 5

(d) 8

$3 \times 0 + 5 \times 1 = 5$

$\sin 0 = 0 \qquad \cos 0 = 1$

$\theta = 0^\circ$

$5 \sin 0^\circ - 3 \cos 0^\circ = -3$

PYQ – 24 – I

If $3 \sin \theta + 5 \cos \theta = 5$, then what is the value of $5 \sin \theta - 3 \cos \theta$?

(a) -3

(b) -2

(c) 5

(d) 8

Ans: (a)

PYQ – 24 – I

What is the minimum value of $\frac{\sin^2 A + 5\sin A + 1}{\sin A}$ for $0 < A \leq \frac{\pi}{2}$?

(a) 3

(b) 5

(c) 7

(d) 9

$$\sin A + 5 + \frac{1}{\sin A}$$

$$\left(\sin A + \frac{1}{\sin A}\right) + 5$$

$$2 + 5 = 7$$

$A + \frac{1}{A}$

(min. value = 2

for A = 1)

PYQ – 24 – I

What is the minimum value of $\frac{\sin^2 A + 5\sin A + 1}{\sin A}$ for $0 < A \leq \frac{\pi}{2}$?

(a) 3

(b) 5

(c) 7

(d) 9

Ans: (c)

PYQ – 24 – I

If tan (3A) = cot (A – 22°), where 3A is an acute angle, then what is the value of A ?

(a) 25°

(b) 27°

(c) 28°

(d) 30°

$\cot(90^\circ - 3A) = \cot(A - 22^\circ)$

$90^\circ - 3A = A - 22^\circ$

$4A = 112^\circ$

$A = 28^\circ$

PYQ – 24 – I

If $\tan(3A) = \cot(A - 22°)$, where $3A$ is an acute angle, then what is the value of A ?

(a) $25°$

(b) $27°$

(c) $28°$

(d) $30°$

Ans: (c)

PYQ – 24 – I

If $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = p\sec\theta + q\tan\theta$,

where $0 < \theta < \frac{\pi}{2}$, then what is $p + q$ equal to ?

(a) 0

(b) 1

(c) 2

(d) 4

Let $\theta = 45°$

$$\frac{\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}} + 1}{\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} - 1} = p\sqrt{2} + q(1)$$

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

$p = 1$

$q = 1$

$p + q = 2$

PYQ – 24 – I

If $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = p\sec\theta + q\tan\theta$,

where $0 < \theta < \frac{\pi}{2}$, then what is $p + q$ equal to ?

(a) 0

(b) 1

(c) 2

(d) 4

Ans: (c)

PYQ – 24 – I

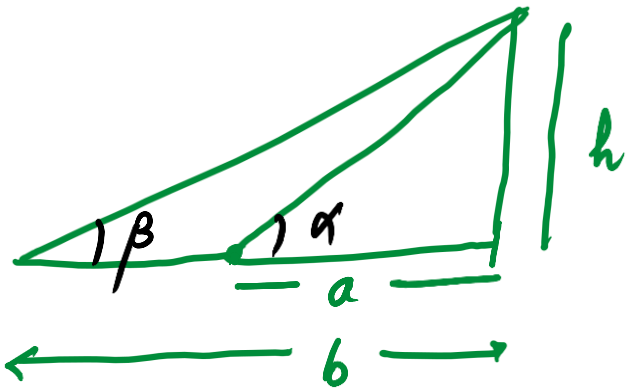
The angles of elevation of the top of a tower from two points A and B at a distance of x m and (x + 5) m from the base of the tower of height 6 m and in the same straight line with it are complementary. What is the value of x ?

(a) 4 m ✓

(b) 5 m

(c) 6 m

(d) 9 m



$\sqrt{(x)(x+5)} = 6$

$x^2 + 5x - 36 = 0$

(a) 4 m ✓] put options and check

$h = \sqrt{ab}$

$\alpha + \beta = 90^\circ$

(complementary)

PYQ – 24 – I

The angles of elevation of the top of a tower from two points A and B at a distance of x m and (x + 5) m from the base of the tower of height 6 m and in the same straight line with it are complementary. What is the value of x ?

(a) 4 m

(b) 5 m

(c) 6 m

(d) 9 m

Ans: (a)

PYQ – 24 – I

Consider the following statements :

1. In a triangle ABC, if $\sin A + \sin B + \sin C = \frac{3\sqrt{3}}{2}$, then the triangle can be equilateral.

2. In a triangle ABC, if $\cos A + \cos B + \cos C = \frac{3}{2}$, then the triangle can be equilateral.

Which of the statements given above is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

$A = B = C = 60^0$

$\sin A + \sin B + \sin C = \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2}$

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

$\cos A + \cos B + \cos C = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2}$

PYQ – 24 – I

Consider the following statements :

1. In a triangle ABC, if $\sin A + \sin B + \sin C = \frac{3\sqrt{3}}{2}$, then the triangle can be equilateral.

2. In a triangle ABC, if $\cos A + \cos B + \cos C = \frac{3}{2}$, then the triangle can be equilateral.

Which of the statements given above is/are correct ?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Ans: (c)

Q) What is $(\text{cosec } x - \sin x)(\sec x - \cos x)(\tan x + \cot x)$ equal to ?

(a) $\sin x + \cos x$ (b) $\sin x - \cos x$

(c) 2 (d) 1

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

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

Q) What is $(\text{cosec } x - \sin x)(\sec x - \cos x)(\tan x + \cot x)$ equal to ?

(a) $\sin x + \cos x$ (b) $\sin x - \cos x$

(c) 2 (d) 1

Ans: (d)

PYQ – 24 – II

What is the maximum value of $8\sin\theta - 4\sin^2\theta$?

(a) 3

(b) 4

(c) 8

(d) 12

$\sin\theta = \max. = 1$

$8 \times 1 - 4(1)^2 = 8 - 4 = 4$

PYQ – 24 – II

What is the maximum value of $8\sin\theta - 4\sin^2\theta$?

(a) 3

(b) 4

(c) 8

(d) 12

Ans: (b)

PYQ – 24 – II

What is
$(1 + \tan\alpha \tan\beta)^2 + (\tan\alpha - \tan\beta)^2$
equal to ?

(a) $\tan^2\alpha \tan^2\beta$

(b) $\sec^2\alpha \sec^2\beta$

(c) $\tan^2\alpha \cot^2\beta$

(d) $\sec^2\alpha \tan^2\beta$

$1 + \tan^2\alpha \tan^2\beta + 2\tan\alpha\tan\beta + \tan^2\alpha + \tan^2\beta - 2\tan\alpha\tan\beta$

$\sec^2\alpha + \tan^2\beta \sec^2\alpha$

$\sec^2\alpha \sec^2\beta$

OPTIONS

(a) $1 \times 3 = 3$

(b) $2 \times 4 = 8$ ✓

(OR)

$\alpha = 45^\circ \quad \beta = 60^\circ$

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

$= 2 + 6 = 8$ ✓

PYQ – 24 – II

What is
$(1 + \tan\alpha \tan\beta)^2 + (\tan\alpha - \tan\beta)^2$
equal to ?

(a) $\tan^2\alpha \tan^2\beta$

(b) $\sec^2\alpha \sec^2\beta$

(c) $\tan^2\alpha \cot^2\beta$

(d) $\sec^2\alpha \tan^2\beta$

Ans: (b)

PYQ – 24 – II

Consider the following statements :

I. $\tan 50° - \cot 50°$ is positive ✓

II. $\cot 25° - \tan 25°$ is negative ✗

Which of the statements is/are correct ?

(a) I only

(b) II only

(c) Both I and II

(d) Neither I nor II

angle $(\theta) \uparrow \Rightarrow \tan\theta \uparrow$

I) $\tan 50° - \tan 40° > 0$

II) $\tan 65° - \tan 25° > 0$

$0° < \theta < 90° \left(\frac{\pi}{2}\right)$

$\sin\theta$ increases with θ. | $\cos\theta$ decreases with θ.

$\tan\theta$ " " " |

PYQ – 24 – II

Consider the following statements :

I. $\tan 50° - \cot 50°$ is positive

II. $\cot 25° - \tan 25°$ is negative

Which of the statements is/are correct ?

(a) I only

(b) II only

(c) Both I and II

(d) Neither I nor II

Ans: (a)

PYQ – 24 – II

If $0 \leqslant (\alpha - \beta) \leqslant (\alpha + \beta) \leqslant \frac{\pi}{2}$,

$\tan(\alpha + \beta) = \sqrt{3}$ and $\tan(\alpha - \beta) = \frac{1}{\sqrt{3}}$,

then what is $\tan\alpha \cdot \cot 2\beta$ equal to ?

(a) 1

(b) $\sqrt{2}$

(c) $\sqrt{3}$

(d) $\frac{1}{\sqrt{3}}$

$\alpha + \beta = 60^\circ$

$\alpha - \beta = 30^\circ$

$\alpha = 45^\circ \; ; \; \beta = 15^\circ$

$\tan\alpha \cot 2\beta = 1 \times \sqrt{3} = \sqrt{3}$

PYQ – 24 – II

If $0 \leqslant (\alpha - \beta) \leqslant (\alpha + \beta) \leqslant \frac{\pi}{2}$,

$\tan(\alpha + \beta) = \sqrt{3}$ and $\tan(\alpha - \beta) = \frac{1}{\sqrt{3}}$,

then what is $\tan\alpha \cdot \cot 2\beta$ equal to ?

(a) 1

(b) $\sqrt{2}$

(c) $\sqrt{3}$

(d) $\frac{1}{\sqrt{3}}$

Ans: (c)

PYQ – 24 – II

If $64^{\sin^2\theta} + 64^{\cos^2\theta} = 16$

where $0 \leqslant \theta \leqslant \frac{\pi}{2}$,

then what is the value of $\tan\theta + \cot\theta$?

(a) 1

(b) 2

(c) 3

(d) 4

$\sin\theta > 0$; $\cos\theta > 0$

$\sin^2\theta > 0$ $\cos^2\theta > 0$

$64^{\frac{1}{2}} + 64^{\frac{1}{2}} = 16$

$(8) \quad (8)$

$\sin^2\theta = \frac{1}{2}$

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

$\Rightarrow \sin\theta = \cos\theta = \frac{1}{\sqrt{2}}$

$\theta = 45^\circ$

$\tan\theta + \cot\theta = 1 + 1 = 2$

PYQ – 24 – II

If $64^{\sin^2\theta} + 64^{\cos^2\theta} = 16$

where $0 \leqslant \theta \leqslant \frac{\pi}{2}$,

then what is the value of $\tan\theta + \cot\theta$?

(a) 1

(b) 2

(c) 3

(d) 4

Ans: (b)

PYQ – 24 – II

If
$\operatorname{cosec}\theta - \cot\theta = m$ and $\sec\theta - \tan\theta = n$,
then what is $\operatorname{cosec}\theta + \sec\theta$ equal to ?

(a) $\frac{1}{2}\left(m+n+\frac{1}{m}+\frac{1}{n}\right)$

(b) $\left(m+n+\frac{1}{m}+\frac{1}{n}\right)$

(c) $\frac{1}{2}\left(m+n-\frac{1}{m}-\frac{1}{n}\right)$

(d) $\left(m+n-\frac{1}{m}-\frac{1}{n}\right)$

$\theta = 45^\circ$

$m = \sqrt{2} - 1$ $\quad n = \sqrt{2} - 1$

$\frac{1}{m} = \sqrt{2}+1$ $\quad \frac{1}{n} = \sqrt{2}+1$

$\operatorname{cosec}\theta + \sec\theta = 2\sqrt{2}$

(a) $\frac{1}{2}\left(2\sqrt{2} + 2\sqrt{2}\right) = 2\sqrt{2}$

PYQ – 24 – II

If
$\operatorname{cosec}\theta - \cot\theta = m$ and $\sec\theta - \tan\theta = n$,
then what is $\operatorname{cosec}\theta + \sec\theta$ equal to ?

(a) $\frac{1}{2}\left(m+n+\frac{1}{m}+\frac{1}{n}\right)$

(b) $\left(m+n+\frac{1}{m}+\frac{1}{n}\right)$

(c) $\frac{1}{2}\left(m+n-\frac{1}{m}-\frac{1}{n}\right)$

(d) $\left(m+n-\frac{1}{m}-\frac{1}{n}\right)$

Ans: (a)

PYQ – 24 – II

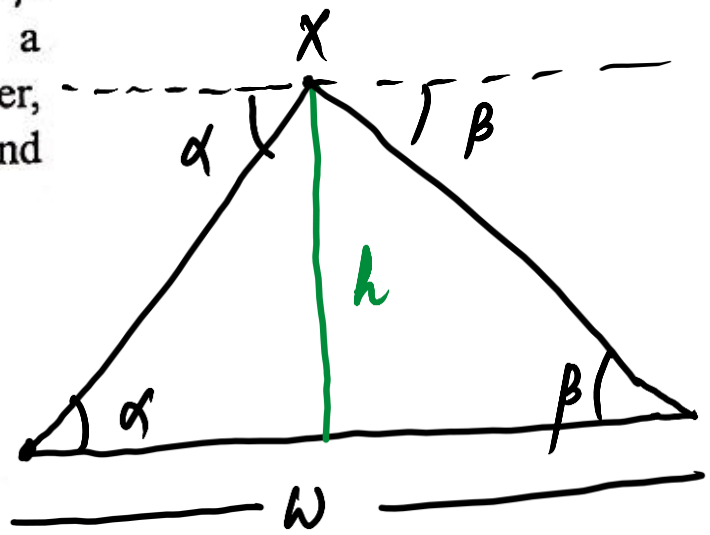
From a point X on a bridge across a river, the angles of depression of two points P and Q on the banks on opposite side of the river are α and β respectively. If the point X is at a height h above the surface of the river, what is the width of the river if α and β are complementary ?

(a) $2h(\tan\alpha + \cot\alpha)$

(b) $H\tan\alpha \cdot \tan\beta$

(c) $h\cot\alpha \cdot \cot\beta$

(d) $h\sec\alpha \cdot \operatorname{cosec}\alpha$ ✓



$$w = h(\cot\alpha + \cot\beta)$$

$$= h(\cot\alpha + \tan\alpha)$$

$$h\left(\frac{1}{\sin\alpha\cos\alpha}\right)$$

$$= h\operatorname{cosec}\alpha\sec\alpha$$

PYQ – 24 – II

From a point X on a bridge across a river, the angles of depression of two points P and Q on the banks on opposite side of the river are α and β respectively. If the point X is at a height h above the surface of the river, what is the width of the river if α and β are complementary ?

(a) $2h(\tan\alpha + \cot\alpha)$

(b) $H\tan\alpha \cdot \tan\beta$

(c) $h\cot\alpha \cdot \cot\beta$

(d) $h\sec\alpha \cdot \operatorname{cosec}\alpha$

Ans: (d)

PYQ – 24 – II

If p and q are the roots of the equation $x^2 - \sin^2\theta\, x - \cos^2\theta = 0$, then what is the minimum value of $p^2 + q^2$?

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

(b) 1

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

(d) 2

PYQ – 24 – II

If p and q are the roots of the equation $x^2 - \sin^2\theta\, x - \cos^2\theta = 0$, then what is the minimum value of $p^2 + q^2$?

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

(b) 1

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

(d) 2

Ans: (b)

PYQ – 24 – II

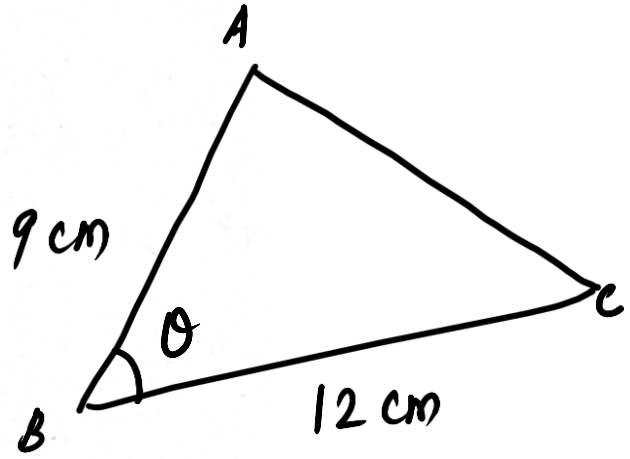
Let ABC be a triangle with area 36 square cm. If $AB = 9$ cm, $BC = 12$ cm and $\angle ABC = \theta$, then what is $\cos\theta$ equal to ?

(a) $\frac{\sqrt{5}}{3}$

(b) $\frac{\sqrt{5}}{4}$

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

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



$\Delta = \frac{1}{2}ab\sin C$

$\frac{1}{2}bc\sin A$

$\frac{1}{2}ac\sin B$

$36 = \frac{1}{2} \times 9 \times 12 \times \sin\theta$

$\frac{2}{3} = \sin\theta \Rightarrow \cos\theta = \sqrt{1-\sin^2\theta}$

$= \sqrt{1-\frac{4}{9}} = \frac{\sqrt{5}}{3}$

PYQ – 24 – II

Let ABC be a triangle with area 36 square cm. If $AB = 9$ cm, $BC = 12$ cm and $\angle ABC = \theta$, then what is $\cos\theta$ equal to ?

(a) $\frac{\sqrt{5}}{3}$

(b) $\frac{\sqrt{5}}{4}$

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

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

Ans: (a)

PYQ – 24 – II

What is

$$\left(\frac{\cos\theta-\sin\theta+1}{\cos\theta+\sin\theta-1}\right)(\cot\theta-\operatorname{cosec}\theta)$$

equal to ?

(a) –1

(b) 0

(c) 1

(d) 2

$\theta = 45^\circ$

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

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

PYQ – 24 – II

What is

$$\left(\frac{\cos\theta-\sin\theta+1}{\cos\theta+\sin\theta-1}\right)(\cot\theta-\operatorname{cosec}\theta)$$

equal to ?

(a) -1

(b) 0

(c) 1

(d) 2

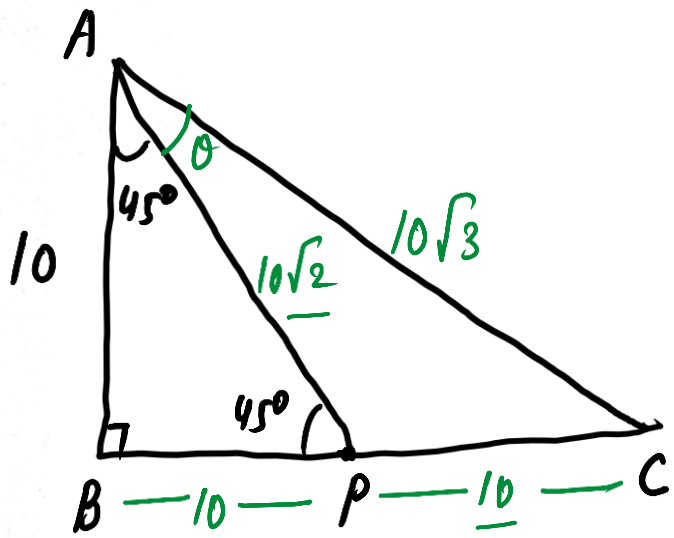
Ans: (a)

PYQ – 24 – II

Let ABC be a triangle right-angled at B.
Let P be the point on BC such that $BP = PC$.
If $AB = 10$ cm, $\angle BAP = 45°$ and $\angle CAP = \theta$

$\left(\text{use } \tan(\alpha+\beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}\right)$

What is $\tan\theta$ equal to ?



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

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

(c) $\frac{1}{4}$

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

$$\tan(45° + \theta) = \frac{20}{10} \Rightarrow \frac{1 + \tan\theta}{1 - \tan\theta} = \frac{2}{1}$$

$$\frac{1+\tan\theta}{1-\tan\theta} = \frac{2}{1}$$

$$\frac{2}{2\tan\theta} = \frac{3}{1}$$

$$\frac{1}{\tan\theta} = 3$$

$$\tan\theta = \frac{1}{3}$$

$$\frac{a}{b} = \frac{c}{d}$$

$$\frac{a+b}{a-b} = \frac{c+d}{c-d}$$

PYQ – 24 – II

Let ABC be a triangle right-angled at B. Let P be the point on BC such that $BP = PC$. If $AB = 10$ cm, $\angle BAP = 45°$ and $\angle CAP = \theta$

$\left(\text{use } \tan(\alpha+\beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha \tan\beta} \right)$

What is $\tan\theta$ equal to ?

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

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

(c) $\frac{1}{4}$

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

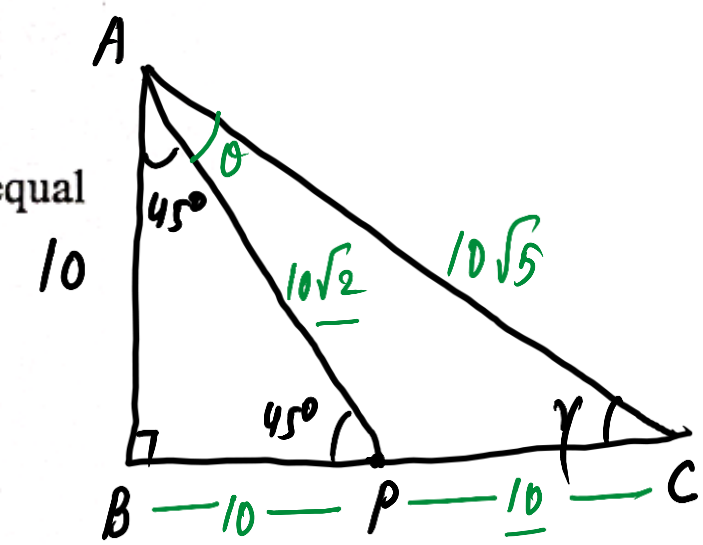
Ans: (b)

PYQ – 24 – II

Let ABC be a triangle right-angled at B. Let P be the point on BC such that $BP = PC$. If $AB = 10$ cm, $\angle BAP = 45°$ and $\angle CAP = \theta$

$\left(\text{use } \tan(\alpha+\beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}\right)$

If $\angle ACP = \gamma$, then what is $\tan\gamma$ equal to ?



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

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

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

(d) 1

$$\tan\gamma = \frac{10}{20} = \frac{1}{2}$$

PYQ – 24 – II

Let ABC be a triangle right-angled at B. Let P be the point on BC such that $BP = PC$. If $AB = 10$ cm, $\angle BAP = 45°$ and $\angle CAP = \theta$

$$\left(\text{use } \tan(\alpha+\beta) = \frac{\tan\alpha + \tan\beta}{1 - \tan\alpha \tan\beta}\right)$$

If $\angle ACP = \gamma$, then what is $\tan\gamma$ equal to ?

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

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

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

(d) 1

Ans: (a)

PYQ – 24 – II

Let ABC be a triangle right-angled at B.
Let P be the point on BC such that $BP = PC$.
If $AB = 10$ cm, $\angle BAP = 45°$ and $\angle CAP = \theta$

$\left(\text{use } \tan(\alpha+\beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}\right)$ Consider the following statements :

I. The line segment AP divides the area of the triangle ABC into two equal parts ✓

II. The perimeter of the triangle APC is more than 46 cm ✓

III. The area of the triangle APC is 50 square cm ✓

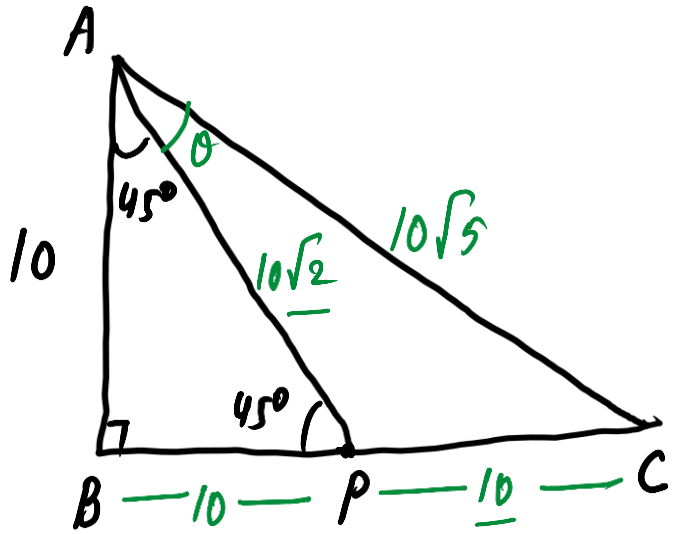
Which of the statements given above are correct ?

(a) I and II only

(b) II and III only

(c) I and III only

(d) I, II and III



I.) $ar(\triangle ABP) = \frac{1}{2} \times 10 \times 10 = 50\ cm^2$

$ar(\triangle APC) = ar(\triangle ABC) - ar(\triangle ABP)$

$$ar(\triangle ABC) = \frac{1}{2} \times 20 \times 10 = 100\ cm^2$$

$$ar(\triangle APC) = 100 - 50 = 50\ cm^2$$

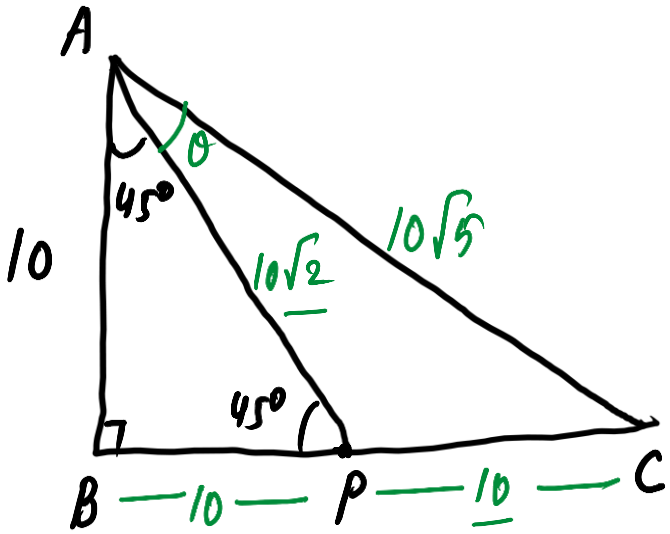
III)

II) $10\sqrt{2} + 10 + 10$

$10(1 + \sqrt{2} + \sqrt{5})$

$10(1 + 1.414 + 2.25)$

$10(4.664) = 46.664 > 46$



PYQ – 24 – II

Let ABC be a triangle right-angled at B.
Let P be the point on BC such that $BP = PC$.
If $AB = 10$ cm, $\angle BAP = 45°$ and $\angle CAP = \theta$

$\left(\text{use } \tan(\alpha+\beta) = \dfrac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}\right)$

Consider the following statements :

I. The line segment AP divides the area of the triangle ABC into two equal parts

II. The perimeter of the triangle APC is more than 46 cm

III. The area of the triangle APC is 50 square cm

Which of the statements given above are correct ?

(a) I and II only

(b) II and III only

(c) I and III only

(d) I, II and III

Ans: (d)

Q) If $\sec\theta + \tan\theta = 2$, then what is the value of $\sec\theta$?

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

(b) $\sqrt{2}$

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

(d) $\frac{5}{4}$

Q) If $\sec\theta + \tan\theta = 2$, then what is the value of $\sec\theta$?

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

(b) $\sqrt{2}$

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

(d) $\frac{5}{4}$

Ans: (d)

Q) What is $\dfrac{(\sin\theta+\cos\theta)(\tan\theta+\cot\theta)}{\sec\theta+\operatorname{cosec}\theta}$ equal to?

(a) 1
(b) 2
(c) $\sin\theta$
(d) $\cos\theta$

Q) What is $\dfrac{(\sin\theta+\cos\theta)(\tan\theta+\cot\theta)}{\sec\theta+\operatorname{cosec}\theta}$ equal to?

(a) 1
(b) 2
(c) $\sin\theta$
(d) $\cos\theta$

Ans: (a)

Q) If $a^2 = \dfrac{1+2\sin\theta\cos\theta}{1-2\sin\theta\cos\theta}$, then what is the value of $\dfrac{a+1}{a-1}$?

(a) $\sec\theta$
(b) 1
(c) 0
(d) $\tan\theta$

Q) If $a^2 = \dfrac{1+2\sin\theta\cos\theta}{1-2\sin\theta\cos\theta}$, then what is the value of $\dfrac{a+1}{a-1}$?

(a) $\sec\theta$
(b) 1
(c) 0
(d) $\tan\theta$

Ans: (d)

Q) If $3 \sin x + 5 \cos x = 5$, then what is the value of $(3 \cos x - 5 \sin x)$?

(a) 0
(b) 2
(c) 3
(d) 5

Q) If $3 \sin x + 5 \cos x = 5$, then what is the value of $(3 \cos x - 5 \sin x)$?

(a) 0
(b) 2
(c) 3
(d) 5

Ans: (c)

Q) The value of

$$\frac{\cot 5^\circ.\cot 10^\circ.\cot 15^\circ.\cot 60^\circ.\cot 75^\circ.\cot 80^\circ.\cot 85^\circ}{(\cos^2 20^\circ + \cos^2 70^\circ) + 2}$$ is

(a) $\frac{9}{\sqrt{3}}$ (b) $\frac{1}{9}$ (c) $\frac{1}{\sqrt{3}}$ (d) $\frac{\sqrt{3}}{9}$

Q) The value of

$$\frac{\cot 5^\circ.\cot 10^\circ.\cot 15^\circ.\cot 60^\circ.\cot 75^\circ.\cot 80^\circ.\cot 85^\circ}{(\cos^2 20^\circ + \cos^2 70^\circ) + 2}$$ is

(a) $\frac{9}{\sqrt{3}}$ (b) $\frac{1}{9}$ (c) $\frac{1}{\sqrt{3}}$ (d) $\frac{\sqrt{3}}{9}$

Ans: (d)

Q) If $\sin 17^\circ = \frac{x}{y}$, then $\sec 17^\circ - \sin 73^\circ$ is equal to

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

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

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

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

Q) If $\sin 17^\circ = \frac{x}{y}$, then $\sec 17^\circ - \sin 73^\circ$ is equal to

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

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

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

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

Ans: (d)

Q) If $0° < \theta < 90°$, then all the trigonometric ratios can be obtained when

(a) only $\sin\theta$ is given

(b) only $\cos\theta$ is given

(c) only $\tan\theta$ is given

(d) any one of the six ratios is given

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(a) only $\sin\theta$ is given

(b) only $\cos\theta$ is given

(c) only $\tan\theta$ is given

(d) any one of the six ratios is given

Ans: (d)

Q) If $\cos x + \sec x = 2$, then what $\cos^n x + \sec^n x$ equal to, where n is a positive integer?

(a) 2
(b) 2^{n-2}
(c) 2^{n-1}
(d) 2^n

Q) If $\cos x + \sec x = 2$, then what $\cos^n x + \sec^n x$ equal to, where n is a positive integer?

(a) 2
(b) 2^{n-2}
(c) 2^{n-1}
(d) 2^n

Ans: (a)

Q) If $\frac{3-\tan^2 A}{1-3\tan^2 A} = K$

where K is a real number, then cosec A$(3\sin A - 4\sin^3 A)$ is equal to

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

(b) $\frac{2K}{K-1}$, where $\frac{1}{3} \le K \le 3$

(c) $\frac{2K}{K-1}$, where $K < \frac{1}{3}$ or $K > 3$

(d) $\frac{2K}{K+1}$

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(c) $\frac{2K}{K-1}$, where $K < \frac{1}{3}$ or $K > 3$

(d) $\frac{2K}{K+1}$

Ans: (c)

Q) If $\tan\theta = \frac{2}{3}$, then $\frac{3\sin\theta - 4\cos\theta}{3\sin\theta + 4\cos\theta}$ is equal to:

(a) $-\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $-\frac{2}{3}$ (d) $\frac{1}{3}$

Q) If $\tan\theta = \frac{2}{3}$, then $\frac{3\sin\theta - 4\cos\theta}{3\sin\theta + 4\cos\theta}$ is equal to:

(a) $-\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $-\frac{2}{3}$ (d) $\frac{1}{3}$

Ans: (a)

Q) If $\sin\theta = \sqrt{3}\cos\theta$, $0° < \theta < 90°$, then the value of $2\sin^2\theta + \sec^2\theta + \sin\theta\sec\theta + \operatorname{cosec}\theta$ is:

(a) $\frac{33+10\sqrt{3}}{6}$

(b) $\frac{19+10\sqrt{3}}{6}$

(c) $\frac{33+10\sqrt{3}}{3}$

(d) $\frac{19+10\sqrt{3}}{3}$

Q) If $\sin\theta = \sqrt{3}\cos\theta$, $0° < \theta < 90°$, then the value of $2\sin^2\theta + \sec^2\theta + \sin\theta\sec\theta + \operatorname{cosec}\theta$ is:

(a) $\frac{33+10\sqrt{3}}{6}$

(b) $\frac{19+10\sqrt{3}}{6}$

(c) $\frac{33+10\sqrt{3}}{3}$

(d) $\frac{19+10\sqrt{3}}{3}$

Ans: (a)

Q) What is the value of

$$\frac{\left\{\begin{array}{l}\left[4\cos(90-A)\sin^3(90+A)\right]- \\ \left[4\sin(90+A)\cos^3(90-A)\right]\end{array}\right\}}{\cos\left(\frac{180+8A}{2}\right)}?$$

(a) 1 (b) -1 (c) 0 (d) 2

Q) What is the value of

$$\frac{\left\{\begin{bmatrix}4\cos(90-A)\sin^3(90+A)\end{bmatrix}-\\\begin{bmatrix}4\sin(90+A)\cos^3(90-A)\end{bmatrix}\right\}}{\cos\left(\frac{180+8A}{2}\right)}?$$

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

Q) If $(\sin x + \operatorname{cosec} x)^2 + (\cos x + \sec x)^2$

$$= k + \tan^2 x + \cot^2 x,$$

then what is the value of k?

(a) 8 (b) 7

(c) 4 (d) 3

Q) If $(\sin x + \operatorname{cosec} x)^2 + (\cos x + \sec x)^2$

$$= k + \tan^2 x + \cot^2 x,$$

then what is the value of k?

(a) 8 (b) 7

(c) 4 (d) 3

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

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

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

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

Ans: (b)

Q) If $\sin\theta + \cos\theta = \sqrt{2}$, then what is $\sin^6\theta + \cos^6\theta + 6\sin^2\theta\cos^2\theta$ equal to?

(a) $\frac{1}{4}$ (b) $\frac{3}{4}$ (c) 1 (d) $\frac{7}{4}$

Q) If $\sin\theta + \cos\theta = \sqrt{2}$, then what is $\sin^6\theta + \cos^6\theta + 6\sin^2\theta\cos^2\theta$ equal to?

(a) $\frac{1}{4}$ (b) $\frac{3}{4}$ (c) 1 (d) $\frac{7}{4}$

Ans: (d)

Q) What is $\frac{\sin^6\theta - \cos^6\theta}{\sin^2\theta - \cos^2\theta}$ equal to?

(a) $\sin^4\theta - \cos^4\theta$

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

(c) $1 + \sin^2\theta\cos^2\theta$

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

Q) What is $\frac{\sin^6\theta - \cos^6\theta}{\sin^2\theta - \cos^2\theta}$ equal to?

(a) $\sin^4\theta - \cos^4\theta$

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

(c) $1 + \sin^2\theta\cos^2\theta$

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

Ans: (b)

Q) If $\sec\theta - \operatorname{cosec}\theta = \frac{4}{3}$, then what is $(\sin\theta - \cos\theta)$ equal to

(a) Only –2

(b) Only $\frac{1}{2}$

(c) Both –2 and $\frac{1}{2}$

(d) Neither $\frac{1}{2}$ nor –2

Q) If $\sec\theta - \operatorname{cosec}\theta = \frac{4}{3}$, then what is $(\sin\theta - \cos\theta)$ equal to

(a) Only –2

(b) Only $\frac{1}{2}$

(c) Both –2 and $\frac{1}{2}$

(d) Neither $\frac{1}{2}$ nor –2

Ans: (c)

Q) The value of $\cot(45^\circ + \theta)\cot(45^\circ - \theta)$ is

(a) -1 (b) 0 (c) 1 (d) ∞

Q) The value of $\cot(45^\circ + \theta)\cot(45^\circ - \theta)$ is

(a) -1 (b) 0 (c) 1 (d) ∞

Ans: (c)

Q) What is the value of $\frac{1-2\sin^2\theta\cos^2\theta}{\sin^4\theta+\cos^4\theta}+4$ equal to?

(a) 0 (b) 1 (c) 2 (d) 5

Q) What is the value of $\frac{1-2\sin^2\theta\cos^2\theta}{\sin^4\theta+\cos^4\theta}+4$ equal to?

(a) 0 (b) 1 (c) 2 (d) 5

Ans: (d)

Q) The value of $\dfrac{\cos^3 20^\circ - \cos^3 70^\circ}{\sin^3 70^\circ - \sin^3 20^\circ}$ is

(a) $\dfrac{1}{2}$ (b) $\dfrac{1}{\sqrt{2}}$ (c) 1 (d) 2

Q) The value of $\dfrac{\cos^3 20^\circ - \cos^3 70^\circ}{\sin^3 70^\circ - \sin^3 20^\circ}$ is

(a) $\dfrac{1}{2}$ (b) $\dfrac{1}{\sqrt{2}}$ (c) 1 (d) 2

Ans: (c)

Q) If the angles of a triangle are 30° and 45° and the included side is $\left(\sqrt{3}+1\right)$ cm, then what is the area of the triangle ?

(a) $\left(\sqrt{3}+1\right)$ cm^2

(b) $\left(\sqrt{3}+3\right)$ cm^2

(c) $\frac{1}{2}\left(\sqrt{3}+1\right)$ cm^2

(d) $2\left(\sqrt{3}+1\right)$ cm^2

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(c) $\frac{1}{2}\left(\sqrt{3}+1\right)$ cm^2

(d) $2\left(\sqrt{3}+1\right)$ cm^2

Ans: (c)

Q) Consider the following :

1. $\frac{\cos A}{1-\tan A}+\frac{\sin A}{1-\cot A}=\cos A+\sin A$

2. $(1-\sin A-\cos A)^2 = 2(1-\sin A)(1+\cos A)$

Which of the above is/are identity/identities?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Q) Consider the following :

1. $\frac{\cos A}{1-\tan A}+\frac{\sin A}{1-\cot A}=\cos A+\sin A$

2. $(1-\sin A-\cos A)^2 = 2(1-\sin A)(1+\cos A)$

Which of the above is/are identity/identities?

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

Ans: (c)

Q) If α and β are positive angles such that $\alpha + \beta = \frac{\pi}{4}$, then what is $(1 + \tan\alpha)(1 + \tan\beta)$ equal to?

(a) 0 (b) 1

(c) 2 (d) 3

Q) If α and β are positive angles such that $\alpha + \beta = \frac{\pi}{4}$, then what is $(1 + \tan\alpha)(1 + \tan\beta)$ equal to?

(a) 0 (b) 1

(c) 2 (d) 3

Ans: (c)

Q) If $2\cos^2 x + 3\sin x - 3 = 0, 0 \leq x \leq 180°$ the value of x is

(a) $30°, 90°, 150°$

(b) $60°, 120°, 180°$

(c) $0°, 30°, 150°$

(d) $45°, 90°, 135°$

Q) If $2\cos^2 x + 3\sin x - 3 = 0, 0 \leq x \leq 180°$ the value of x is

(a) $30°, 90°, 150°$ (b) $60°, 120°, 180°$

(c) $0°, 30°, 150°$ (d) $45°, 90°, 135°$

Ans: (b)

Q) If $\operatorname{cosec}\theta - \sin\theta = p^3$ and $\sec\theta - \cos\theta = q^3$, then what is the value of $\tan\theta$?

(a) $\frac{p}{q}$ (b) $\frac{q}{p}$ (c) pq (d) p^2q^2

Q) If $\operatorname{cosec}\theta - \sin\theta = p^3$ and $\sec\theta - \cos\theta = q^3$, then what is the value of $\tan\theta$?

$(a)\ \frac{p}{q}$ $(b)\ \frac{q}{p}$ $(c)\ pq$ $(d)\ p^2q^2$

Ans: (b)

Q) From an aeroplane flying about a river at an altitude of 1200 m, it is observed that the angles of depression of opposite points on the two banks of a river are $30°$ and θ. If the width of the river is 3000 m, then which one of the following is correct ?

(a) $\theta < 30°$ (b) $30° < \theta < 45°$

(c) $45° < \theta < 60°$ (d) $60° < \theta < 90°$

Q) From an aeroplane flying about a river at an altitude of 1200 m, it is observed that the angles of depression of opposite points on the two banks of a river are 30° and θ. If the width of the river is 3000 m, then which one of the following is correct ?

(a) $\theta < 30°$ (b) $30° < \theta < 45°$

(c) $45° < \theta < 60°$ (d) $60° < \theta < 90°$

Ans: (c)

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

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

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

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

Ans: (b)

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LIVE

MATHS

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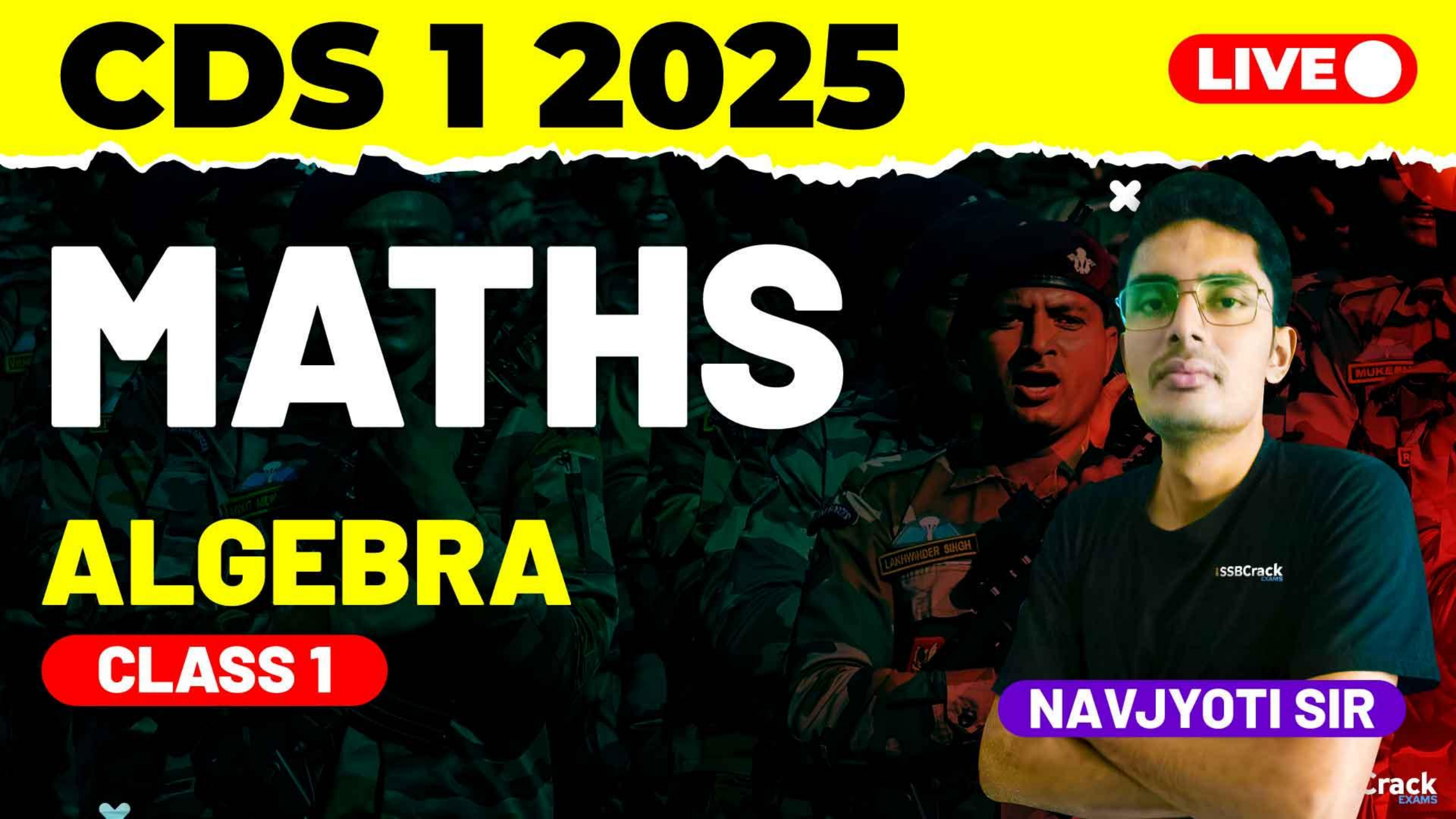
CLASS 1



NAVJYOTI SIR

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EXAMS