

CLASS – 10

MATHEMATICS

CH – 8 : Introduction to Trigonometry

CBSE Board

Previous Year Questions – 1

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1. If $2 \tan A = 3$ then the value of

$$\frac{4 \sin A + 3 \cos A}{4 \sin A - 3 \cos A} \text{ is}$$

(CBSE 2023)

B. $\frac{1}{\sqrt{13}}$

D. does not exist

Handwritten solution:

$$\tan A = \frac{3}{2}$$

$$\frac{4 \sin A + 3 \cos A}{\cos A}$$

$$\frac{4 \sin A - 3 \cos A}{\cos A}$$

$$= \frac{4 \tan A + 3}{4 \tan A - 3}$$

$$= \frac{4 \times \frac{3}{2} + 3}{2 \times \frac{3}{2} - 3} = \frac{9}{3}$$

A. $\frac{7}{\sqrt{13}}$

C. 3

2. Given that $\cos\theta = \frac{\sqrt{3}}{2}$, then the

value of $\frac{\operatorname{cosec}^2\theta - \sec^2\theta}{\operatorname{cosec}^2\theta + \sec^2\theta}$ is

(CBSE Term I, 2021-22)

Handwritten solution on a chalkboard:

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

$$\frac{(2)^2 - (2/\sqrt{3})^2}{(2)^2 + (2/\sqrt{3})^2}$$
$$\frac{4 - 4/3}{4 + 4/3} = \frac{8/3}{16/3}$$

The chalkboard also features a watermark 'mg' and a small 'C' next to the final result.

A. -1

B. 1

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

D. $-\frac{1}{2}$

3. $\frac{1}{\operatorname{cosec} \theta (1 - \cot \theta)} + \frac{1}{\sec \theta (1 - \tan \theta)}$

is equal to

(CBSE Term I, 2021-22)

$$\frac{\sin \theta}{1 - \cot \theta} + \frac{\cos \theta}{1 - \tan \theta}$$

$$\frac{\sin \theta}{1 - \frac{\cos \theta}{\sin \theta}} + \frac{\cos \theta}{1 - \frac{\sin \theta}{\cos \theta}}$$

$$\frac{\sin \theta \times \sin \theta}{\sin \theta - \cos \theta} + \frac{\cos^2 \theta}{\cos \theta - \sin \theta}$$

$$\frac{\sin^2 \theta}{\sin \theta - \cos \theta} - \frac{\cos^2 \theta}{\sin \theta - \cos \theta}$$

A. 0

B. 1

C. $\sin \theta + \cos \theta$

D. $\sin \theta - \cos \theta$

$$\frac{\sin^2 \theta}{\sin \theta - \cos \theta} - \frac{\cos^2 \theta}{\sin \theta - \cos \theta}$$

~~$\sin^2 \theta - \cos^2 \theta$~~

~~$(\sin \theta - \cos \theta)(\sin \theta + \cos \theta)$~~

~~$(\sin \theta - \cos \theta)$~~

4. If $\sin\theta = \cos\theta$, then the value of

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

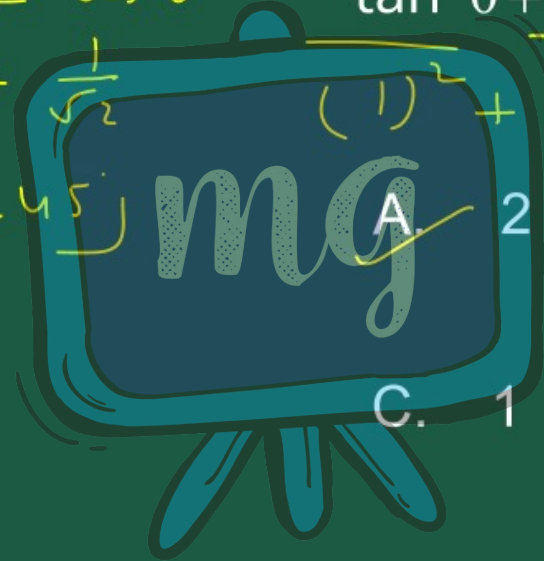
$$\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$\theta = 45^\circ$$

$$\tan^2\theta + \cot^2\theta \text{ is}$$

$$(1)^2 + (1)^2$$

(CBSE 2020)



A. 2

B. 4

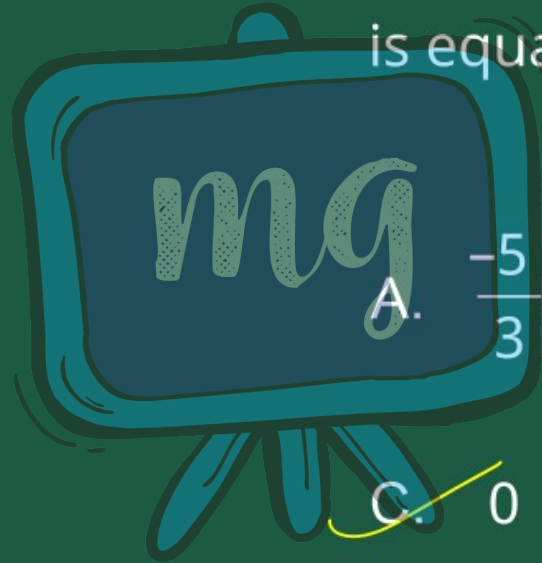
C. 1

D. $\frac{10}{3}$

5. $\left[\frac{5}{8} \sec^2 60^\circ - \tan^2 60^\circ + \cos^2 45^\circ \right]$

is equal to

(CBSE 2023)



A. $\frac{-5}{3}$

B. $\frac{-1}{2}$

C. 0

D. $\frac{-1}{4}$

$$= \frac{5}{8} \left[\sec^2 60 - \tan^2 60 + \cos^2 45 \right]$$

$$\frac{5}{8} \times \left[(2)^2 - (\sqrt{3})^2 + \left(\frac{1}{\sqrt{2}}\right)^2 \right]$$

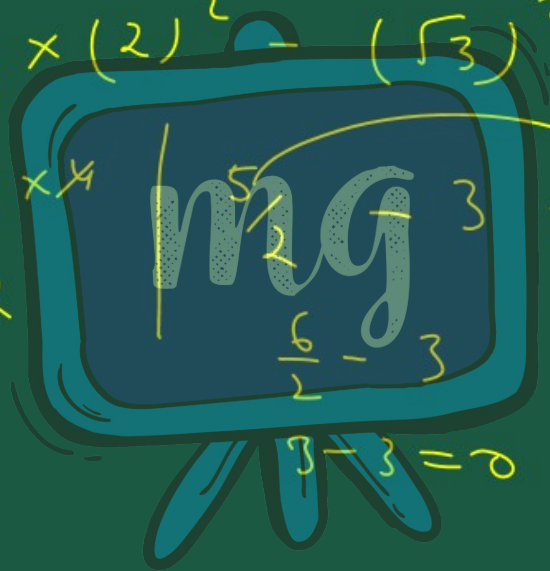
$$\frac{5}{8} \times \left[4 - 3 + \frac{1}{2} \right]$$

$$\frac{5}{8} \times \left[\frac{6}{2} - 3 + \frac{1}{2} \right]$$

$$\frac{5}{8} \times \left[\frac{6 - 6 + 1}{2} \right]$$

$$\frac{5}{8} \times \left[\frac{1}{2} \right]$$

$$\frac{5}{16}$$



6. Given that $\sin \alpha = \frac{\sqrt{3}}{2}$ and $\tan \beta = \frac{1}{\sqrt{3}}$,
then the value of $\cos (\alpha - \beta)$ is

(CBSE Term I ,2021-22)

A chalkboard character with a face and legs. The board contains the following handwritten text in yellow:

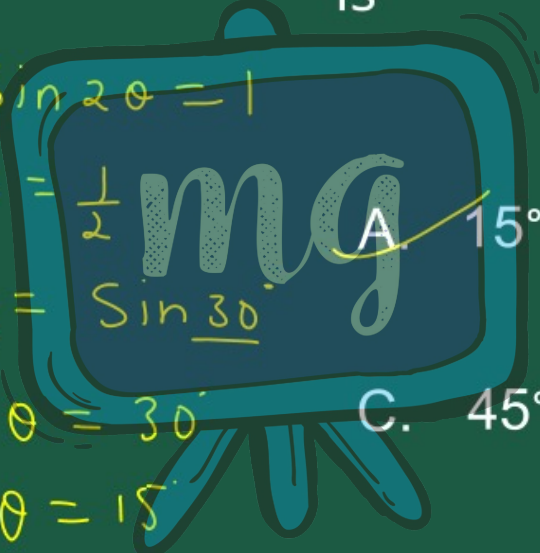
- $\sin \alpha = \frac{\sqrt{3}}{2}$
- $\alpha = 60^\circ$
- $\tan \beta = \frac{1}{\sqrt{3}}$
- $\beta = 30^\circ$
- $\cos (60^\circ - 30^\circ)$
- $\cos 30^\circ = \frac{\sqrt{3}}{2}$

The board also features the 'mg' logo and a multiple-choice option: A. $\frac{\sqrt{3}}{2}$.

- B. $\frac{1}{2}$
- C. 0
- D. $\frac{1}{\sqrt{2}}$

7. The value of θ for which $2\sin 2\theta = 1$
is

(CBSE Term I, 2021-22)



Handwritten solution on a chalkboard:

$$2\sin 2\theta = 1$$
$$\sin 2\theta = \frac{1}{2}$$
$$\sin 2\theta = \sin 30^\circ$$
$$2\theta = 30^\circ$$
$$\theta = 15^\circ$$

The chalkboard also features a watermark 'mg' and a checkmark next to the final answer 'A. 15°'.

A. 15°

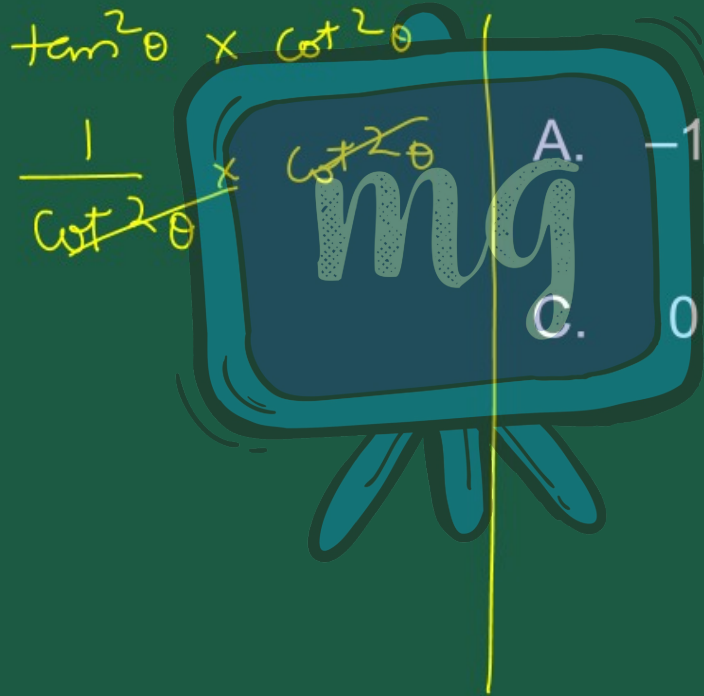
B. 30°

C. 45°

D. 60°

8. $(\sec^2 \theta - 1)(\operatorname{cosec}^2 \theta - 1)$ is equal to

(CBSE 2023)



- A. -1
- B. 1
- C. 0
- D. 2

9. Which of the following is true for

all values of $\theta (0^\circ \leq \theta < 90^\circ)$?

(CBSE 2023)

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$\tan^2 \theta = \sec^2 \theta - 1$$

$$1 = \sec^2 \theta - \tan^2 \theta$$

A. $\cos^2 \theta - \sin^2 \theta = 1$

B. $\operatorname{cosec}^2 \theta - \sec^2 \theta = 1$

C. $\sec^2 \theta - \tan^2 \theta = 1$

D. $\cot^2 \theta - \tan^2 \theta = 1$

10. Given that $\sin \theta = \frac{p}{q}$, $\tan \theta$ is equal to

(CBSE Term I, 2021-22)

$\sin \theta = \frac{p}{q}$

$\sin \theta = \frac{p}{H}$

$\tan \theta = \frac{p}{B}$

A. $\frac{p}{\sqrt{p^2 - q^2}}$

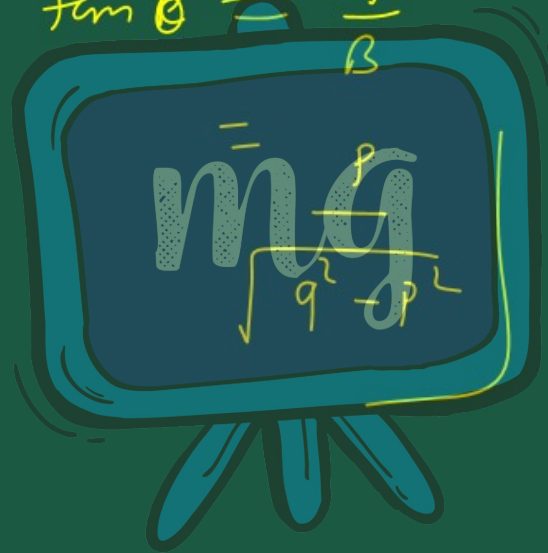
C. $\frac{p}{\sqrt{q^2 - p^2}}$

~~B. $\frac{q}{\sqrt{p^2 - q^2}}$~~

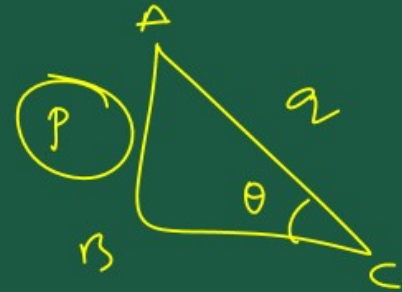
~~D. $\frac{q}{\sqrt{q^2 - p^2}}$~~

$$\sin \theta = \frac{P}{a}$$

$$\tan \theta = \frac{P}{B}$$



$$\tan \theta$$



$$\underline{AC^2 = AB^2 + BC^2}$$

$$AC^2 - AB^2 = BC^2$$

$$q^2 - P^2 = BC^2$$

$$\underline{\sqrt{q^2 - P^2} = BC}$$

11. The simplest form of

$$\sqrt{(1 - \cos^2 \theta)(1 + \tan^2 \theta)}$$

$$\sin^2 \theta \times$$

$$\sin^2 \theta \times$$

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

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

A. $\cos \theta$

B. $\sin \theta$

C. $\cot \theta$

D. $\tan \theta$

(CBSE Term I, 2021-22)

12. If $\sin^2 \theta + \sin \theta = 1$ then the value of $\cos^2 \theta + \cos^4 \theta$ is

(CBSE Term I, 2021-22)

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

$$\sin \theta = 1 - \sin^2 \theta$$

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

$$\sin^2 \theta = \cos^4 \theta$$

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

A. -1

B. 1

C. 0

D. 2

13. The distance between the points
 $(a\cos\theta + b\sin\theta, 0)$ and $(0, a\sin\theta - b\cos\theta)$

is

(CBSE 2020)

A. $a^2 + b^2$

B. $a^2 - b^2$

C. $\sqrt{a^2 + b^2}$

D. $\sqrt{a^2 - b^2}$

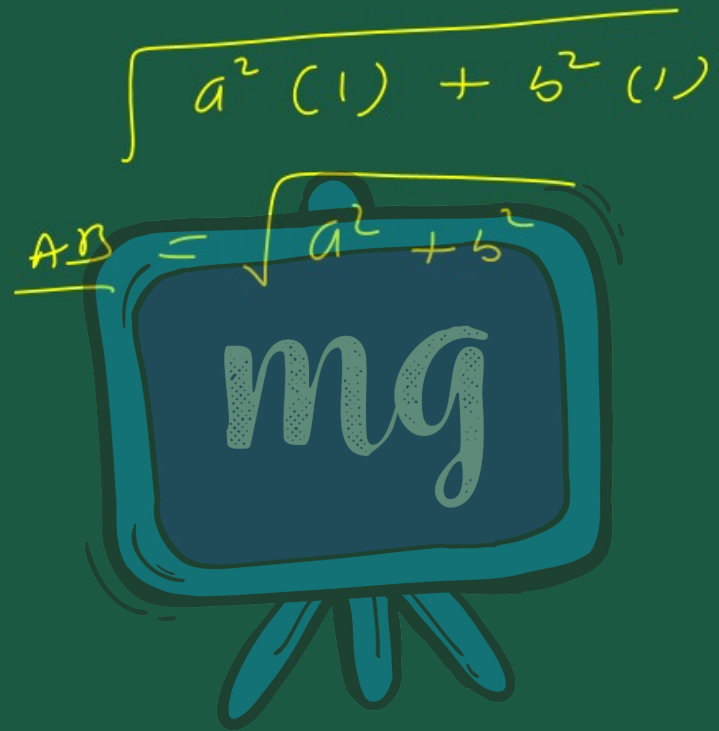
$$\begin{array}{ccc}
 A & & B \\
 \hline
 (x_1, y_1) & & (x_2, y_2) \\
 (a \cos \theta + b \sin \theta, 0) & & (0, a \sin \theta - b \cos \theta)
 \end{array}$$

Distance formula: - $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$$\begin{aligned}
 AB &= \sqrt{[0 - (a \cos \theta + b \sin \theta)]^2 + [a \sin \theta - b \cos \theta - 0]^2} \\
 &= \sqrt{\left[\frac{a^2 \cos^2 \theta + b^2 \sin^2 \theta + 2ab \sin \theta \cos \theta}{} \right.} \\
 &\quad \left. + \frac{a^2 \sin^2 \theta + b^2 \cos^2 \theta - 2ab \sin \theta \cos \theta}{} \right]} \\
 &= \sqrt{a^2 (\sin^2 \theta + \cos^2 \theta) + b^2 (\sin^2 \theta + \cos^2 \theta)}
 \end{aligned}$$

$$\sqrt{a^2(1) + b^2(1)}$$

AB = $\sqrt{a^2 + b^2}$



mg