TRIGONOMETRY
PYQ'S
2025,2024,2023

2025

$\tan 2A = 3 \tan A$ is true, when the measure of $\angle A$ is: 1

(a) 90° (b) 60°

(c) 45° (d) 30°

[2025]

Which of the following statements is true? [2025]

(a) $\sin 20^\circ > \sin 70^\circ$ (b) $\sin 20^\circ > \cos 20^\circ$

(c) $\cos 20^\circ > \cos 70^\circ$ (d) $\tan 20^\circ > \tan 70^\circ$

Which of the following is a trigonometric identity? 1

(a) $\sin^2\theta = 1 + \cos^2\theta$ (b) $\operatorname{cosec}^2\theta + \cot^2\theta = 1$

(c) $\sec^2\theta = 1 + \tan^2\theta$ (d) $\sin 2\theta = 2 \sin\theta$ [2025]

$\sec A = 2 \cos A$ is true for $A =$ [2025]

(a) 0° (b) 30°

(c) 45° (d) 60°

If $x\left(\dfrac{2\tan 30^\circ}{1+\tan^2 30^\circ}\right) = y\left(\dfrac{2\tan 30^\circ}{1-\tan^2 30^\circ}\right)$, then $x : y =$

(a) $1:1$ (b) $1:2$

(c) $2:1$ (d) $4:1$

[2025]

In a right triangle ABC, right-angled at A, if $\sin B = \frac{1}{4}$, then the value of $\sec B$ is **[2025]** **1**

(a) 4 (b) $\frac{\sqrt{15}}{4}$

(c) $\sqrt{15}$ (d) $\frac{4}{\sqrt{15}}$

(a) 4

(c) $\sqrt{15}$

If $x = \cos 30° - \sin 30°$ and $y = \tan 60° - \cot 60°$, then **1**

[2025]

(a) $x = y$ (b) $x > y$

(c) $x < y$ (d) $x > 1, y < 1$

If $x = 2\sin 60° \cos 60°$ and $y = \sin^2 30° - \cos^2 30°$ and $x^2 = ky^2$, the value of k is: **1**

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

(c) 3 (d) -3

[2025]

(A) Prove that $\dfrac{\cos A+\sin A-1}{\cos A-\sin A+1}=\operatorname{cosec} A-\cot A$

[2025]

(B) If $\cot\theta+\cos\theta=p$ and $\cot\theta-\cos\theta=q$, prove that $p^2-q^2=4\sqrt{pq}$

[2025]

(a) If $a\sec\theta+b\tan\theta=m$ and $b\sec\theta+a\tan\theta=n$, prove that $a^2+n^2=b^2+m^2$ [2025]

OR

(b) Use the identity: $\sin^2 A+\cos^2 A=1$ to prove $\tan^2 A+1=\sec^2 A$. Hence, find the value of ta when $\sec A=\dfrac{5}{3}$, where A is an acute angle.

[2025]

(a) Prove that: $\dfrac{\cos\theta-2\cos^3\theta}{\sin\theta-2\sin^3\theta}+\cot\theta=0.$

OR

(b) Given that $\sin\theta+\cos\theta=x$, prove that $\sin^4\theta+\cos^4\theta$ $=\dfrac{2-(x^2-1)^2}{2}$. [2025] 3

2024

If $\sec\theta - \tan\theta = m$, then the value of $\sec\theta + \tan\theta$ is:

(a) $1 - \frac{1}{m}$ (b) $m^2 - 1$ [2024]

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

If $\cos(\alpha + \beta) = 0$, then value of $\cos\left(\frac{\alpha+\beta}{2}\right)$ is equal to: [2024]

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

(c) 0 (d) $\sqrt{2}$

A solid sphere is cut into two hemispheres. The ratio of the surface areas of sphere to that of two hemispheres taken together, is:

(a) 1 : 1 (b) 1 : 4 [2024]

(c) 2 : 3 (d) 3 : 2

The distance between the points $(a\cos\theta, -a\sin\theta)$ and $(a\sin\theta, a\cos\theta)$ is

(a) a (b) $a\sqrt{2}$ [2024]

(c) 0 (d) $2a$

If $\sin A = \frac{2}{3}$, then value of cot A is:

[2024]

(a) $\frac{\sqrt{5}}{2}$

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

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

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

For $\theta = 30°$, the value of $(2 \sin \theta \cos \theta)$ is:

(a) 1

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

[2024]

(c) $\frac{\sqrt{3}}{4}$

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

. If $\sin \theta = \cos \theta$, $(0° < \theta < 90°)$, then value of $(\sec \theta \cdot \sin \theta)$ is:

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

(b) $\sqrt{2}$

[2024]

(c) 1

(d) 0

. If $\sin\theta = \cos\theta$, $(0° < \theta < 90°)$, then value of $(\sec\theta \cdot \sin\theta)$ is: **[2024]**

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

(b) $\sqrt{2}$

(c) 1

(d) 0

Assertion (A): If $\sin A = \frac{1}{3}(0° < A < 90°)$, then the value of cos A is $\frac{2\sqrt{2}}{3}$ **[2024]**

Reason (R): For every angle θ, $\sin^2\theta + \cos^2\theta = 1$.

The distance between the points $(a\cos\theta, -a\sin\theta)$ and $(a\sin\theta, a\cos\theta)$ is

(a) a

(b) $a\sqrt{2}$ **[2024]**

(c) 0

(d) $2a$

(a) Evaluate : $2\sqrt{2}\ \cos 45° \sin 30° + 2\sqrt{3}\ \cos 30°$

[2024]

OR

(b) If $A = 60°$ and $B = 30°$, verify that: $\sin(A + B) = \sin A \cos B + \cos A \sin B$

Prove that : $\dfrac{\tan\theta}{1-\cot\theta} + \dfrac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta.\text{cosec}\,\theta$ [2024]

(a) Evaluate : $2 \sin^2 30° \sec 60° + \tan^2 60°$. [2024]

OR

(b) If $2 \sin(A + B) = \sqrt{3}$ and $\cos(A - B) = 1$, then find the measures of angles A and B.

$0 \le A, B, (A + B) \le 90°$.

Prove that $\dfrac{1+\sec\theta-\tan\theta}{1+\sec\theta+\tan\theta} = \dfrac{1-\sin\theta}{\cos\theta}$. [2024]

Prove that $\sin^6\theta + \cos^6\theta = 1 - 3\sin^2\theta\cos^2\theta$. [2024]

Prove that $\dfrac{\operatorname{cosec}^2\theta - \sec^2\theta}{\operatorname{cosec}^2\theta + \sec^2\theta} = \dfrac{3}{4}$, if $\tan\theta = \dfrac{1}{\sqrt{7}}$ [2024]

2023

Sec θ when expressed in terms of Cot θ, is equal to:

(a) $\frac{1+\cot^2\theta}{\cot\theta}$

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

[2023]

(c) $\frac{\sqrt{1+\cot^2\theta}}{\cot\theta}$

(d) $\frac{\sqrt{1-\cot^2\theta}}{\cot\theta}$

Which of the following is true for all values of θ ($0° \le \theta \le 90°$) ? **[2023]**

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

(b) $\text{cosec}^2\theta - \sec^2\theta = 1$

(c) $\sec^2\theta - \tan^2\theta = 1$

(d) $\cot^2\theta - \tan^2\theta = 1$

$(\sec^2\theta - 1)(\text{cosec}^2\theta - 1)$ is equal to:

(a) -1

(b) 1 **[2023]**

(c) 0

(d) 2

$\frac{\cos^2\theta}{\sin^2\theta} - \frac{1}{\sin^2\theta}$, in simplified form is: [2023]

(a) $\tan^2\theta$
(b) $\sec^2\theta$
(c) 1
(d) -1

If θ is an acute angle of a right angled triangle, then which of the following equation is not true? [2023]

(a) $\sin\theta\cot\theta = \cos\theta$
(b) $\cos\theta\tan\theta = \sin\theta$
(c) $\operatorname{cosec}^2\theta - \cot^2\theta = 1$
(d) $\tan^2\theta - \sec^2\theta = 1$

$(\cos^4 A - \sin^4 A)$ on simplification, gives [2023]

(a) $2\sin^2 A - 1$
(b) $2\sin^2 A + 1$
(c) $2\cos^2 A + 1$
(d) $2\cos^2 A - 1$

If $\tan\theta = \frac{x}{y}$, then $\cos\theta$ is equal to [2023]

(a) $\frac{x}{\sqrt{x^2+y^2}}$
(b) $\frac{y}{\sqrt{x^2+y^2}}$
(c) $\frac{x}{\sqrt{x^2-y^2}}$
(d) $\frac{y}{\sqrt{x^2-y^2}}$

(A) Evaluate: $$\frac{5\cos^2 60° + 4\sec^2 30° - \tan^2 45°}{\sin^2 30° + \cos^2 30°}$$

[2023]

OR

(B) If A and B are acute angles such that $\sin(A - B) = 0$ and $2\cos(A + B) - 1 = 0$, then find angles A and B.

(A) Prove that: $$\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$$

[2023]

OR

(B) Prove that $\sec A (1 - \sin A)(\sec A + \tan A) = 1$.

(A) Evaluate:

$$\frac{5}{\cot^2 30°} + \frac{1}{\sin^2 60°} - \cot^2 45° + 2\sin^2 90°$$

[2023]

OR

(B) If θ is an acute angle and $\sin\theta = \cos\theta$, find the value of $\tan^2\theta + \cot^2\theta - 2$.

(A) Evaluate $2\sec^2\theta + 3\,\text{cosec}^2\theta - 2\sin\theta\cos\theta$ if $\theta = 45°$.

[2023]

OR

(B) If $\sin\theta - \cos\theta = 0$, then find the value of $\sin^4\theta + \cos^4\theta$.

If $\sin\theta + \cos\theta = p$ and $\sec\theta + \text{cosec}\,\theta = q$, then prove that $q(p^2 - 1) = 2p$. [2023]

Prove that: $\dfrac{1+\sec A}{\sec A} = \dfrac{\sin^2 A}{1-\cos A}$. [2023]

Prove that $(\sin\theta + \cos\theta)(\tan\theta + \cot\theta) = \sec\theta + \text{cosec}\,\theta$. [2023]