FlexiPrep

# CBSE Class 10-Mathematics: Chapter – 8 Introduction to Trigonometry Part 7 (For CBSE, ICSE, IAS, NET, NRA 2022)



**Question 15**:

Write the other trigonometric ratios of A in terms of $\sec A$ .

**Answer**:

For $\sin A$ ,

By using identity, $\sin^2 A + \cos^2 A = 1$

$$\Rightarrow \sin^2 A = 1 - \cos^2 A$$

$$\Rightarrow \sin^2 A = 1 - \frac{1}{\sec^2 A}$$

$$= \frac{\sec^2 A - 1}{\sec^2 A}$$

$$\Rightarrow \sin A = \frac{\sqrt{\sec^2 A - 1}}{\sec A}$$

For $\cos A$ ,

$$\cos A = \frac{1}{\sec A}$$

For $\tan A$ ,

By using identity $\sec^2 A - \tan^2 A = 1$

$$\Rightarrow \tan^2 A = \sec^2 A - 1$$

$$\Rightarrow \tan A = \sqrt{\sec^2 A - 1}$$

For $\cos ec\, A$,

$$\cos ec\, A = \frac{1}{\sin A} = \frac{1}{\frac{\sqrt{\sec^2 A - 1}}{\sec A}}$$

$$\Rightarrow \cos ecA = \frac{\sec A}{\sqrt{\sec^2 A - 1}}$$

For $\cot A$,

$$\cot A = \frac{1}{\tan A}$$

$$\Rightarrow \cot A = \frac{1}{\sqrt{\sec^2 A - 1}}$$

**Question16**:

Evaluate:

(i) $\frac{\sin^2 63° + \sin^2 27°}{\cos^2 17° + \cos^2 73°}$

(ii) $\sin 25° \cos 65° + \cos 25° \sin 65°$

**Answer**:

(i)

$$\frac{\sin^2 63° + \sin^2 27°}{\cos^2 17° + \cos^2 73°}$$

$$= \frac{\sin^2 63° + \sin^2 (90° - 63°)}{\cos^2 (90° - 73°) + \cos^2 73°}$$

$$= \frac{\sin^2 63° + \cos^2 63°}{\sin^2 73° + \cos^2 73°}$$

$[\because \sin (90° - \theta) = \cos \theta, \ \cos (90° - \theta) = \sin \theta]$

$$= \frac{1}{1} = 1 \left[\because \sin^2 \theta + \cos^2 \theta = 1\right]$$

(ii) $\sin 25° \cos 65° + \cos 25° \sin 65°$

$= \sin 25°. \cos (90° - 25°) + \cos 25°. \sin (90° - 25°)$

$= \sin 25°. \sin 25° + \cos 25°. \cos 25°$

$[\because \sin (90° - \theta) = \cos \theta, \ \cos (90° - \theta) = \sin \theta]$

$= \sin^2 25° + \cos^2 25° = 1$

$\left[\because \sin^2 \theta + \cos^2 \theta = 1\right]$

**Question17**:

Show that any positive odd integer is of the form $6q + 1$, or $6q + 3$, or $6q + 5$, where $q$ is some integer.

**Answer**:

Let $a$ be any positive integer and $b = 6$ . Then, by Euclid's algorithm,

$a = 6q + r$ for some integer $q \geqslant 0$ , and $r = 0,1,2,3,4,5$ because $0 \leqslant r < 6$ .

Therefore, $a = 6q$ or $6q + 1$ or $6q + 2$ or $6q + 3$ or $6q + 4$ or $6q + 5$

Also, $6q + 1 = 2 \times 3q + 1 = 2k_1 + 1$ , where $k_1$ is a positive integer

$6q + 3 = (6q + 2) + 1 = 2(3q + 1) + 1 = 2k_2 + 1$ , where $k_2$ is an integer

$6q + 5 = (6q + 4) + 1 = 2(3q + 2) + 1 = 2k_3 + 1$, where $k_3$ is an integer

Clearly, $6q + 1, 6q + 3, 6q + 5$ are of the form, where $k$ is an integer.

Therefore, $6q + 1, 6q + 3, 6q + 5$ are not exactly divisible by $2$ . Hence, these expressions of numbers are odd numbers.

And therefore, any odd integer can be expressed in the form $6q + 1$, or $6q + 3$ ,

Or $6q + 5$

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