Directorate of Education, GNCT of Delhi

Subject: Maths | Worksheet: 35 | Date: 23.09.2020

Class X | Name of Student: _____ Name of the Class Teacher: _____

Trigonometric identities (Part I) ($Sin^2\theta+Cos^2\theta=1$)

Recall and Answer --

1. $(Sin\ 30^0+Cos\ 30^0)-(Sin\ 60^0+Cos\ 60^0)$ = _____
2. $Sin^2 30^o+Cos^2 30^o$= _____
3. If SinA=1/2 and Cos A=√3/2 , then Sin^2A+Cos^2A= _____

-Did u notice something about the value of $Sin^2\theta+Cos^2\theta$?
- Today we will learn about Trigonometric Identities?
-absolutely correct!

- Means, an equation with one or more trigonometric ratios and satisfied by all possible values of angles.

First Identity-

$Sin^2\theta+Cos^2\theta=1$ which can rewritten as ⇒ $1- Sin^2\theta= Cos^2\theta$ (by moving $Sin^2\theta$ to the other side of' '=') Similarly,

$1- Cos^2\theta= Sin^2\theta$

Let's See some examples based on this identity-

Example1- Write all other trigonometric ratios in terms of SecA

Solution: We know that the identity $\sin^2 A + \cos^2 = 1$

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

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

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

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

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

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

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

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

Example2- If x = a sin θ and y = a cos θ then find the value of $x^2 + y^2$.

Solution:- GIVEN: x = a sin θ and y = a cos θ

$x^2 + y^2$ = $(a \sin \theta)^2 + (a \cos \theta)^2$ On Putting the value of x &

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

= $a^2 (\sin^2 \theta + \cos^2\theta)$

= a^2 (1) [using $\sin^2 \theta + \cos^2 \theta = 1$]

⇨ $x^2 + y^2 = a^2$ (Hence proved)

Example 3- If $Sin\theta + Sin^2\theta=1$, Find the value of $Cos^2\theta+cos^4\theta$.

Solution: Given $Sin\ \theta + Sin^2\theta=1$

⇒ $Sin\ \theta = 1- Sin^2\theta$

(using identity $1-Sin^2\theta= Cos^2\theta$)

⇒ $Sin\ \theta= Cos^2\theta$

⇒ $Sin^2\theta = Cos^4\theta$ (squaring both sides)

$1- Cos^2\theta = Cos^4\theta$

⇒ $Cos^2\theta+cos^4\theta=1$

(using identity $1-Sin^2\theta= Cos^2\theta$)

Try Yourself

1.Fill in the blanks-

(i) _____$+Cos^2\theta=1$.

(ii) $1- Sin^2\theta$ = _____.

(iii) 1- _____= $Sin^2\theta$

2. Show:

$Sec^2x+Cosec^2x=Sec^2x\times Cosec^2x$

3. If $Sec^2\theta\ (1-Sin\ \theta)(1+Sin\ \theta)=k$, find the value of k.

4. Write all other trigonometric ratios in terms of sin x.