OUR OWN HIGH SCHOOL, AL WARQA'A, DUBAI

GRADE: X - INTRODUCTION TO TRIGONOMETRY

$\sin^2\theta + \cos^2\theta = 1$,	$\sin^2\theta = 1 - \cos^2\theta$,	$\cos^2\theta = 1 - \sin^2\theta$
$\sec^2\theta = 1 + \tan^2\theta$,	$\sec^2\theta - \tan^2\theta = 1$,	$\tan^2\theta = \sec^2\theta - 1$
$\operatorname{cosec}^2\theta = 1 + \cot^2\theta$,	$\operatorname{cosec}^2\theta - \cot^2\theta = 1$,	$\cot^2\theta = \operatorname{cosec}^2\theta - 1$

ASSIGNMENT 1

Prove the following identities:

1. $\dfrac{\sin A}{1+\cos A} + \dfrac{\sin A}{1 - \cos A} = 2\operatorname{cosec} A$
2. $\dfrac{\sec A - \tan A}{\sec A + \tan A} = 1 - 2\sec A \tan A + 2\tan^2 A$
3. $\dfrac{\cos A}{1-\tan A} + \dfrac{\sin A}{1-\cot A} = \cos A + \sin A$
4. $\dfrac{\tan A}{1+\cos A} + \dfrac{\sin A}{1-\cos A} = \cot A + \operatorname{cosec} A.\sec A$
5. $\dfrac{1}{\operatorname{cosec}\theta - \cot\theta} - \dfrac{1}{\sin\theta} = \dfrac{1}{\sin\theta} - \dfrac{1}{\operatorname{cosec}\theta - \cot\theta}$

ASSIGNMENT 2

Prove the following identities:

1. $\dfrac{1+\cos\theta+\sin\theta}{1+\cos\theta-\sin\theta} = \dfrac{1+\sin\theta}{\cos\theta}$
2. $\dfrac{\tan\theta}{1-\cot\theta} + \dfrac{\cot\theta}{1-\tan\theta} = 1 + \tan\theta + \cot\theta = \sec\theta.\operatorname{cosec}\theta + 1$
3. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, show that: $m^2 - n^2 = 4\sqrt{mn}$
4. If $x \sin^3\theta + y \cos^3\theta = \sin\theta \cos\theta$, and $x \sin\theta = y \cos\theta$, prove that $x^2 + y^2 = 1$.
5. If $\cos\theta - \sin\theta = 1$, show that $\cos\theta + \sin\theta = 1$ or -1.

ASSIGNMENT 3

1. If $3\cot\theta = 5$, find the value of, $\dfrac{5\sin\theta - 2\cos\theta}{5\sin\theta + 3\cos\theta}$.
2. If $\tan\theta = \dfrac{7}{24}$, then prove that $\sqrt{\dfrac{1-\cos\theta}{1+\cos\theta}} = \dfrac{1}{7}$.

3. Find the value of: $\text{cosec}^2 45^0 \sec^2 30^0 (\sin^3 30^0 + 4\cot^2 45^0 - \sec^2 60^0)$.

4. Evaluate: $\dfrac{\tan^2 60^0 + 4\sin^2 45^0 + 3\sec^2 30^0 + 5\cos^2 90^0}{\text{cosec}\, 30^0 + \sec 60^0 - \cot^2 30^0}$

5. Without using trigonometric tables evaluate:

$$\frac{\cos 58^0}{\sin 32^0} + \frac{\sin 22^0}{\cos 68^0} - \frac{\cos 38^0 . \cos ec 52^0}{\tan 18^0 . \tan 35^0 . \tan 60^0 . \tan 72^0 . \tan 55^0}$$

6. Without using trigonometric tables evaluate:

$$2\left(\frac{\cos^2 20 + \cos^2 70}{\sin^2 25 + \sin^2 65}\right) - \tan 45 + \tan 13 \tan 23 \tan 30 \tan 67 \tan 77$$

7. If $\sin (A+B) = \dfrac{\sqrt{3}}{2}$ and $\tan (A - B) = \dfrac{1}{\sqrt{3}}$, find A and B.

8. If $2\text{cosec}^2 30 + x \sin^2 60 - \dfrac{3}{4}\tan^2 30 = 10$, find the value of x.

ANSWERS

ASSIGNMENT 3

1. $\dfrac{1}{6}$ 3. $\dfrac{1}{3}$ 4. 9 5. $\dfrac{6-\sqrt{3}}{3}$ 6. $\dfrac{3-\sqrt{3}}{3}$ 7. 45^0 8. $x = 3$

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Mathematics Department