MATHEMATICS

Class-X **Marks-50**

TRIGNOMETRY

1) Prove: $\dfrac{1+\cos\theta+\sin\theta}{1+\cos\theta-\sin\theta}=\dfrac{1+\sin\theta}{\cos\theta}$

2) Prove: $\dfrac{(1+\cot\theta+\tan\theta)(\sin\theta-\cos\theta)}{\sec^3\theta-\cos ec^3\theta}=\sin^2\theta.\cos^2\theta$

3) Prove: $\dfrac{\tan^2\theta}{\tan^2\theta-1}+\dfrac{\cos ec^2\theta}{\sec^2\theta-\cos ec^2\theta}=\dfrac{1}{\sin^2\theta-\cos^2\theta}$

4) Prove: $\cot^2\theta\left(\dfrac{\sec\theta-1}{1+\sin\theta}\right)+\sec^2\theta\left(\dfrac{\sin\theta-1}{1+\sec\theta}\right)=0$

5) If cos θ + sin θ = $\sqrt{2}$ cos θ, show that cos θ –sin θ = $\sqrt{2}$ sin θ.

6) Without using tables, evaluate the following:

(i) cos (40^o + θ) – sin (50^o- θ) + $\dfrac{\cos^2 40^0+\cos^2 50^0}{\sin^2 40^0+\sin^2 50^0}$

(ii) sec^{2}10^o – cot^2 80^o + $\dfrac{\sin 15^0\cos 75^0+\cos 15^0\sin 75^0}{\cos\theta\sin(90-\theta)+\sin\theta\cos(90-\theta)}$

(iii) $\dfrac{\sec^2 54^0-\cot^2 36^0}{\cos ec^2 57^0-\tan^2 33^0}+2\sin^2 38^0.\sec^2 52^0-\sin^2 45$

7) From an Airplane vertically over a straight horizontal road the angles of depression of two consecutive milestones on opposite side of the Airplane are observed to be α and β. Show that the height in miles of the Airplane above the road is given by $\dfrac{\tan\alpha\tan\beta}{\tan\alpha+\tan\beta}$.

8) From a top of a building 15 m high, the angle of elevation of top of the tower is found to be 30^o. From the bottom of the same building, the angle of elevation of the top of the tower is found to be 60. Find the height of the tower and the distance between the tower and building.

9) The angle of elevation of a jet plane from a point A on the ground is 60^o . After a flight of 15 seconds, the angle of elevation changes to 30^o. If the jet plane is flying at a constant height of 1500√3 m, find the speed of the jet plane.