CLASS –XI **SUBJECT – MATHEMATICS**

ASSIGNMENT- 1 **TOPIC – TRIGONOMETRY**

Q1. The difference between two acute angles of a right triangle is $\frac{\pi}{9}$. Find the angles in degree.

Q2. A horse is tied to a post by a rope. If the horse moves along a circular path always keeping the rope tight and describe 88 metres when it was traced out 72^0 at the centre, find the length of the rope.

Q3. The angles of a triangle are A.P. such that the greatest is 5 times the least. Find the angles in radians.

Q4. Prove that (i) $(1 + \tan\alpha \tan\beta)^2 + (\tan\alpha - \tan\beta)^2 = \sec^2\alpha \sec^2\beta$

(ii) $\frac{\tan A}{1 - Cot A} + \frac{Cot A}{1 - \tan A} = \sec A \operatorname{cosec} A + 1$

Q5. If $\sin\theta = \frac{12}{13}$ and θ lies in 2^{nd} quad, then find the value of $8\tan\theta - \sqrt{5}\sec\theta$

Q6. Prove that :-

(i) $\frac{Cos(2\pi + \theta) Co\sec(2\pi + \theta)\tan\left(\frac{\pi}{2} + \theta\right)}{\sec\left(\frac{\pi}{2} + \theta\right) Cos\,\theta\, Cot(\pi + \theta)} = 1$

(ii) $\frac{\tan(90^0 - \theta)\sec(180^0 - \theta)\sin(-\theta)}{\sin(180^0 + \theta) Cot(360^0 - \theta)\cos ec(90^0 - \theta)} = 1$

(iii) $\frac{\tan 69^0 + \tan 66^0}{1 - \tan 69^0 \tan 66^0} = -1$

(iv) $\frac{Cos\,11^0 + \sin 11^0}{Cos\,11^0 - \sin 11^0} = \tan 56^0$

Q7. If $\tan\alpha = \frac{m}{m+1}$, $\tan\beta = \frac{1}{2m+1}$ then prove that $\alpha + \beta = \frac{\pi}{4}$

Q8. Prove that (i) tan 3A tan 2A tan A = tan 3A – tan 2A – tan A

(ii) (1 + tan A) (1 + tan B) = 2 when $A + B = \frac{\pi}{4}$

Q9. Draw the graph of

(i) y = 3 sin x (ii) y = cosec x (iii) y = sec x

(iv) y = sin x + cos x

Q10. Solve the following trigonometric equations ;-

(i) $\tan\left(\frac{2}{3}\vartheta\right) = \sqrt{3}$

(ii) $7Cos^2\theta + 3\sin^2\theta = 4$

Q11. If tan A = x tanB then prove that $\frac{\sin(A - B)}{\sin(A + B)} = \frac{x - 1}{x + 1}$

Q12. If $\sin A = \frac{3}{5}$, $0 < A < \frac{\pi}{2}$, $Cos B = \frac{-12}{13}$, $\pi < B < 3\frac{\pi}{2}$,find sin(A+B)

Q13. Prove that (i) $\cos 20^0 \cos 40^0 \cos 60^0 \cos 80^0 = \frac{1}{16}$

(ii) $\cos 5A = 16\cos^5 A - 20\cos^3 A + 5\cos A$

Q14. Find the value of (i) $\cos 15^0$ (ii) $\sin 75^0$ (iii) $\tan 75^0$

Q15. Find the general solution of the following trigonometric equations ;-

(i) $\cot^2\theta + \frac{3}{\sin\theta} + 3 = 0$

(ii) $\tan\theta + \tan 2\theta + \tan\theta \tan 2\theta = 1$

(iii) $\tan\theta + \tan 2\theta + \sqrt{3}\tan\theta \tan 2\theta = \sqrt{3}$

(iv) $\sec^2 2x = 1 - \tan 2x$

(v) $\tan\theta + \tan\left(\theta + \frac{\pi}{3}\right) + \tan\left(\theta + \frac{2\pi}{3}\right) = 3$

Q16 In any triangle ABC, if a=16, b=12, c=25 find

(i) Cos A, Cos B, Cos C

(ii) Sin A, Sin B, Sin C

Q17 For any triangle ABC prove that

(i) $\frac{\sin(B-C)}{\sin(B+C)} = \frac{b^2-c^2}{a^2}$

(ii) $\frac{b^2-c^2}{a^2}\sin 2A + \frac{c^2-a^2}{b^2}\sin 2B + \frac{a^2-b^2}{c^2}\sin 2C = 0$

(iii) $a(\cos C - \cos B) = 2(b-c)\cos^2(A/2)$