

Islamabad Model College for Boys H-9

MATHEMATICS ASSIGNMENTS HSSC-I

Assignment 01

Q.1. A railway train is running on a circular track of radius 500 meters at the rate of 30 km per hour. Through what angle will it turn in 10 seconds?

Q.2. If $\cot \theta = \frac{15}{8}$ and terminal arm is not in quadrant I, find the remaining trigonometric ratios.

Q.3. Prove that $\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ = \sin 30^\circ$.

Q.4. Prove that $\frac{\sin \theta}{1 + \cos \theta} + \cot \theta = \csc \theta$.

Q.5. Prove that $\cos 306^\circ + \cos 234^\circ + \cos 162^\circ + \cos 18^\circ = 0$

Q.6. Prove that $\sin \frac{\pi}{9} \sin \frac{2\pi}{9} \sin \frac{\pi}{3} \sin \frac{4\pi}{9} = \frac{3}{16}$.

Q.7. If $\alpha + \beta + \gamma = 0$, show that

$$\cot \alpha \cot \beta + \cot \beta \cot \gamma + \cot \gamma \cot \alpha = 1.$$

Assignment 02

Q.1. Prove that the Sine is a periodic function having period 2π .

Q.2. Find the periods of $3 \cos \frac{x}{5}$ and $\sec 9x$.

Q.3. A plane flying directly above a post 6000 m away from an anti-aircraft observes that the gun is at an angle of depression of 27° . Find the height of the plane.

Q.4. The sides of a triangle are $x^2 + x + 1$, $2x + 1$ and $x^2 - 1$. Prove that the greatest angle of the triangle is 120° .

Q.5. The area of triangle is 2437. If $a = 79$, and $c = 97$, then find angle β .

Q.6. Prove that $r = \frac{\Delta}{s}$ by using usual notations of Trigonometry.

Q.7. Prove that

$$r_1 + r_2 + r_3 - r = 4R$$

Assignment 03

Q.1. Prove that $r^2 \cot \frac{\alpha}{2} \cot \frac{\beta}{2} \cot \frac{\gamma}{2} = \Delta$

Q.2. Prove that $\sin^{-1} \frac{1}{\sqrt{5}} + \cot^{-1} 3 = \frac{\pi}{4}$.

Q.3. Show that $\cos^{-1}(-x) = \pi - \cos^{-1} x$.

Q.4. Prove that $\sin^{-1} \frac{77}{85} - \sin^{-1} \frac{3}{5} = \cos^{-1} \frac{15}{17}$.

In Problems 5 - 7, find the solution sets of the following equations:

Q.5. $3\tan^2\theta + 2\sqrt{3}\tan\theta + 1 = 0$

Q.6. $4\sin^2\theta - 8\cos\theta + 1 = 0$

Q.7. $\sin x + \cos 3x = \cos 5x$.
