DPP – 02

1. In triangle **ABC** prove that

   (a) $\sin A = \sin(B + C)$

   (b) $\sin 2A = -\sin(2B + 2C)$

   (c) $\cos A = -\cos(B + C)$

   (d) $\tan\left(\frac{A+B}{2}\right) = \cot\frac{C}{2}$

2. Prove that $\sin(-420°)(\cos 390°) + \cos(-660°)(\sin 330°) = -1$.

3. Prove that

   a. $\tan 720° - \cos 270° - \sin 150°\cos 120° = \frac{1}{4}$

   b. $\sin 780°\sin 480° + \cos 120°\sin 150° = \frac{1}{2}$

4. If $\alpha = \frac{\pi}{3}$, prove that $\cos \alpha\cos 2\alpha\cos 3\alpha\cos 4\alpha\cos 5\alpha\cos 6\alpha = -\frac{1}{16}$.

5. Find the value of $\tan\frac{\pi}{20}\tan\frac{3\pi}{20}\tan\frac{5\pi}{20}\tan\frac{7\pi}{20}\tan\frac{9\pi}{20}$.

6. Find the value of $\frac{\cot 54°}{\tan 36°} + \frac{\tan 20°}{\cot 70°}$.

7. Prove that $\sin^2\frac{\pi}{18} + \sin^2\frac{\pi}{9} + \sin^2\frac{7\pi}{18} + \sin^2\frac{4\pi}{9} = 2$.

8. Prove that $\sec\left(\frac{3\pi}{2} - \theta\right)\sec\left(\theta - \frac{5\pi}{2}\right) + \tan\left(\frac{5\pi}{2} + \theta\right)\tan\left(\theta - \frac{3\pi}{2}\right) = -1$.

9. In any quadrilateral **ABCD**, prove that

   a. $\sin(A + B) + \sin(C + D) = 0$

   b. $\cos(A + B) = \cos(C + D)$

ANSWER KEY

5.   **1**   **6.**   **2**