BRAIN INTERNATIONAL SCHOOL

SUBJECT : MATHEMATICS　　　CLASS : XI　　　JULY 2024

CHAPTER : TRIGONOMETRY

Q1. Find the value of the following:

(i) $\tan\frac{19\pi}{3}$

(ii) $\cot\left(\frac{-15\pi}{4}\right)$

Q2. If $\tan x = \frac{3}{4}$ and x lies in the third quadrant, find the values of $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ and $tan\,\frac{x}{2}$.

Q3. Prove that: $\cos 20^0\ \cos 40^0\ \cos 60^0\ \cos 80^0 = \frac{1}{16}$.

Q4. Prove that: $\tan 50^0 = \tan 40^0 + 2\ \tan 10^0$.

Q5. Evaluate: $\sin 105^0 + \cos 105^0$.

Q6. Prove that: $\frac{\sin A.\sin 2A+\sin 3A.\sin 6A}{\sin A.\cos 2A+\sin 3A.\cos 6A} = \tan 5A$.

Q7. In a triangle ABC, prove that $sin^2\frac{A}{2} + sin^2\frac{B}{2} + sin^2\frac{C}{2} = 1 - 2\sin\frac{A}{2}sin\frac{B}{2}sin\frac{C}{2}$.

Q8. Find the general solution of the equation, $2\sin x + \sqrt{3}\cos x = 1 + \sin x$.

Q9. Solve for $x : tan^2x + cot^2x = 2$.

Q10. If $\tan A = k\tan B$, show that $\sin(A+B) = \left(\frac{k+1}{k-1}\right)\sin(A-B)$.

Q11. If α, β are the roots of $a\cos\theta + b\sin\theta = c$, show that $cos\ (\alpha +\ \beta) = \frac{a^2-b^2}{a^2+b^2}$.

Q12. Evaluate: $\sin\frac{7\pi}{12}\cos\frac{\pi}{4} - \cos\frac{7\pi}{12}\sin\frac{\pi}{4}$.

Q13. Prove that: $\sin 20^0\ \sin 40^0\ \sin 60^0\ \sin 80^0 = \frac{3}{16}$.

Q14. Write $\frac{13\pi}{4}$ in the degrees.

Q15. Find the value of $\tan\frac{13\pi}{12}$.

Q16. Find the value of $2sin^2\frac{3\pi}{4} + 2cos^2\frac{3\pi}{4} - 2tan^2\frac{3\pi}{4}$.

Q17. Solve the equation $\sin 2x + \cos x = 0$.

Q18. Prove that: $cos^2x + cos^2\left(x + \frac{\pi}{3}\right) + cos^2\left(x - \frac{\pi}{3}\right) = \frac{3}{2}$.

Q19. Show that: $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$.

Q20. Prove that: $\cos 2x . \cos\frac{x}{2} - \cos 3x . \cos\frac{9x}{2} = \sin 5x \sin\frac{5x}{2}$.