CLASS XI – MATHEMATICS – CHAPTER 03

TRIGONOMETRIC FUNCTIONS

Name: Date:

Q01. Convert into radian measures. (– 47°30′)

Q02. Evaluate tan 75°.

Q03. Prove that sin (40 + θ). cos (10 + θ) – cos (40 + θ). sin (10 + θ) = $\frac{1}{2}$

Q04. Find the principal solution of the eq. sin x = $\frac{\sqrt{3}}{2}$

Q05. Prove that cos($\frac{\pi}{4}$ + x) + cos($\frac{\pi}{4}$ – x) = $\sqrt{2}$cosx

Q06. Convert into radian measures – 37^0 30′

Q07. Prove sin(n+1)x.sin(n+2)x + cos(n+1)x.cos (n+2) x = cosx

Q08. Find the value of sin $31\frac{\pi}{3}$

Q09. Find the principal solution of the eq. tan x = $-\frac{1}{\sqrt{3}}$

Q10. Convert into radian measures. 5°37′30″

Q11. Prove cos70°.cos 10° + sin 70°.sin 10° = $\frac{1}{2}$

Q12. Evaluate 2sin $\frac{\pi}{12}$

Q13. Find the solution of sin x = $-\frac{\sqrt{3}}{2}$

Q14. Prove that $\frac{\cos 9^o - \sin 9^o}{\cos 9^o + \sin 9^o}$ = tan 36°

Q15. Find the value of tan $19\frac{\pi}{3}$.

Q16. Prove cos 4x = 1 – 3 $\sin^2$ x.$\cos^2$x

Q17. Prove $\frac{\cos(\pi + x).\cos(-x)}{\sin(-x).\cos(\frac{\pi}{2} + x)}$ = $\cot^2$x

Q18. Prove that $\tan 56^0 = \frac{\cos 11^o + \sin 11^o}{\cos 11^o - \sin 11^o}$

Q19. Prove that cos 105^0 + cos 15^0 = sin 75^0 – sin 15^0

Q20. Find the value of cos (-1710^0).

Q21. A wheel makes 360 revolutions in 1 minute. Through how many radians does it turn in 1 second.

Q22. Prove $\sin^2$6x – $\sin^2$4x = sin2x. sin10x.

Q23. Prove that $\frac{\tan 69 + \tan 66}{1 - \tan 69.\tan 66}$ = –1

Q24. Prove that $\frac{\sin x}{1+\cos x}$ = tan$\frac{x}{2}$

Q25. The minute hand of a watch is 1.5 cm long. How far does it tip move in 40 minute?

Q26. Show that tan3x. tan2x. tanx = tan3x – tan2x – tanx

Q27. Find the value of $\tan\frac{\pi}{3}$.

Q28. Prove that $\frac{\sin(x+y)}{\sin(x-y)} = \frac{\tan x + \tan y}{\tan x - \tan y}$.

Q29. If in two circles, arcs of the same length subtend angles 60^0 and 75^0 at the centre find the ratio of their radii.

Q30. Prove that $\cos 6x = 32\cos^6 x - 48\cos^4 x + 18\cos^2 x - 1$

Q31. Solve sin2x – sin4x + sin6x = 0.

Q32. In a circle of diameter 40cm, the length of a chord is 20cm. Find the length of minor are of the chord.

Q33. Prove that $\tan 4x = \frac{4\tan x(1+\tan 2x)}{1 - 6\tan 2x + \tan 4x}$.

Q34. Prove that $(\cos x + \cos y)^2 + (\sin x - \sin y)^2 = 4\cos^2\left(\frac{x+y}{2}\right)$

Q35. If $\cot x = -\frac{5}{12}$. x lies in second quadrant find the values of other five trigonometric functions.

Q36. Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

Q37. Prove that sinx + sin3x + sin5x + sin7x = 4 cosx cos2x sin4x.

Q38. Find the angle between the minute hand and hour hand of a clock when the time is 7.20.

Q39. Prove that Cot 4x (Sin5x + Sin3x) = Cot x (Sin5x – Sin3x).

Q40. Show that $\sqrt{2 + \sqrt{2 + 2\cos 4\theta}} = 2\cos\theta$

Q41. If Sin α + Sin β = a and Cos α + Cos β = b show that $\cos(\alpha+\beta) = \frac{b^2 - a^2}{b^2 + a^2}$

Q42. Prove that $\cos\alpha + \cos\beta + \cos\gamma + \cos(\alpha+\beta+\gamma) = \cos\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha+\gamma}{2}\right)\cos\left(\frac{\gamma+\alpha}{2}\right)$.

Q43. Prove that $\sin 3x + \sin 2x - \sin x = 4\sin x \cos\frac{x}{2}.\cos\frac{3x}{2}$

Q44. Prove that $2\cos\frac{\pi}{13}\cos\frac{9\pi}{13} + \cos\frac{3\pi}{13} + \cos\frac{5\pi}{13} = 0$

Q45. Find the value of tan (α + β) Given that $\cot\alpha = \frac{1}{2}$, $\alpha \in (\pi, \frac{3\pi}{2})$ and $\sec\beta = -\frac{5}{3}$, $\beta \in (\frac{\pi}{2}, \pi)$.

Q46. Prove that $\frac{\sec 8A - 1}{\sec 4A - 1} = \frac{\tan 8A}{\tan 2A}$

Q47. Prove that $\cos 2x + \cos 2(x + \frac{\pi}{3}) + \cos 2(x - \frac{\pi}{3})$

Q48. Prove that $\cos 2x.\cos\frac{x}{2} - \cos 3x.\cos\frac{9x}{2} = \sin 5x.\sin\frac{5x}{2}$

Q49. Prove that $\cos 200.\cos 400.\cos 600.\cos 800 = \frac{1}{16}$

Q50. If $\tan x = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, Find the value of $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ and $\tan\frac{x}{2}$.