Chapter- 3

TRIGONOMETRIC FUNCTIONS

1. Convert the angle $40° 20'$ into radians.
2. Find the degree measure of $6\ radians$.
3. Find the radian measure of the angle $-22° 30'$.
4. Find the radian measure of $14° 20'15''$.
5. Find the degree measure of $(-3)^c$
6. Find the length of an arc of a circle of radius 3 cm, if the angle subtended at the centre is $30°$. [$\pi = 3.14$]
7. The minute hand of the watch is 1.5 cm long. How far does its tip move in 40 minutes? [$\pi = 3.14$]
8. If the arcs of the same lengths in two circles subtend angles $65°$ and $110°$ at the centre, find the ratio of their radii.
9. 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 70 m when it has traced out $80°$ at the centre, find the length of the rope.
10. Find the distance from the eye at which a coin of diameter 2 cm should be held to conceal the full moon, whose angular diameter is $31'$.
11. Find the value of $cos\theta$ and $tan\theta$, if $sin\theta = -\frac{3}{5}$ and $\pi < \theta < \frac{3\pi}{2}$.
12. If $cos\theta = \frac{3}{5}$ and $0 < \theta < \frac{\pi}{2}$, then evaluate $\frac{cosec\ \theta + cot\theta}{sec\theta - \tan\theta}$.
13. If $secx = 2$ and $\frac{3\pi}{2} < x < 2\pi$, then find the values of all other five trigonometric functions.
14. If $tanx = \frac{3}{4}$ and x lies in the third quadrant, then find the values of $secx$ and $cosecx$.
15. Find the value of $\sin\frac{31\pi}{3}$.
16. Evaluate $cosec\ (690°)$.
17. Prove that $\cos 510° \cos 330° + \sin 390° \cos 120° = -1$.
18. Find the value of $\cos(-1170°)$
19. Find the value of $\tan\frac{29\pi}{3}$.
20. Prove that $\tan(315°)\cot(-405°) + \cot(495°)\tan(-585°) = 2$.
21. Prove that $\frac{\cos(90°+\theta)\sec(-\theta)\tan(180°-\theta)}{\sec(360°-\theta)\sin(180°+\theta)\cot(90°-\theta)} = -1$.
22. Prove that $3\sin\frac{\pi}{6}\sec\frac{\pi}{3} - 4\sin\frac{5\pi}{6}\cot\frac{\pi}{4} = 1$.
23. Find the value of $\cos 15°$.
24. Find the value of $\tan 105°$.
25. Prove that $\sin\left(\frac{4\pi}{9}+7\right)\cos\left(\frac{\pi}{9}+7\right) - \cos\left(\frac{4\pi}{9}+7\right)\sin\left(\frac{\pi}{9}+7\right) = \frac{\sqrt{3}}{2}$.

26. Prove that $\cos 20°cos40° \cos 60° \cos 80° = \frac{1}{16}$.
27. Show that $\tan(60° + \theta) \tan(60° - \theta) = \frac{2\cos 2\theta+1}{2\,cos2\theta-1}$.
28. Prove that $\frac{\sin 5A-\sin 3A}{\cos 5A+\cos 3A} = \tan A$.
29. Prove that $1 + \cos 2x + \cos 4x + \cos 6x = 4\,cosx \cos 2x \cos 3x$
30. Prove that $\frac{sinA+\sin 3A+\sin 5A+\sin 7A}{cosA+\cos 3A+cos5A+\cos 7A} = \tan 4A$.
31. Prove that $\sin 50° - \sin 70° + \sin 10° = 0$.
32. Prove that $\frac{\sin(A-B)}{\cos A \cos B} + \frac{\sin(B-C)}{\cos B \cos C} + \frac{\sin(C-A)}{\cos C \cos A} = 0$.
33. Prove that $\frac{sin11A\,sinA+\sin 7A\,.sin3A}{\cos 11A\,sinA+\cos 7A\,sin3A} = \tan 8A$
34. If $x\,cos\theta = y\cos\left(\theta + \frac{2\pi}{3}\right) = z\cos(\theta + \frac{4\pi}{3})$, prove that $xy + yz + zx = 0$.
35. If $cosA + \cos B = \frac{1}{2}$ and $sinA + sinB = \frac{1}{4}$, prove that $tan\left(\frac{A+B}{2}\right) = \frac{1}{2}$.
36. Prove that $\frac{1+sin2\theta+\cos 2\theta}{1+sin2\theta-\cos 2\theta} = \cot\theta$
37. Prove that $cos^3 2\theta + 3\cos 2\theta = 4(cos^6\theta - sin^6\theta)$
38. If $\tan A = \frac{1}{7}$ and $\tan B = \frac{1}{3}$, show that $\cos 2A = \sin 4B$
39. If $2\tan\frac{\alpha}{2} = \tan\frac{\beta}{2}$, prove that $\cos\alpha = \frac{3+5\cos\beta}{5+3\cos\beta}$
40. Prove that $\frac{\cos 2\theta}{1+\sin 2\theta} = \tan\left(\frac{\pi}{4} - \theta\right)$
41. Prove that $sinA\sin(60° - A)\sin(60° + A) = \frac{1}{4}\sin 3A$
42. Prove that $\cos 5A = 16\,cos^5 A - 20cos^3 A + 5\cos A$
43. If x lies in the 2nd quadrant such that $\sin x = \frac{1}{4}$, then find the values of $\sin\frac{x}{2}$, $\cos\frac{x}{2}$ and $\tan\frac{x}{2}$.
44. If $cosx = -\frac{3}{5}$ and x lies in IInd quadrant, find the values of $sin2x$ and $\sin\frac{x}{2}$.
45. Prove that $cos^3\theta\sin 3\theta + sin^3\theta\cos 3\theta = \frac{3}{4}\sin 4\theta$.