TRIGONOMETRIC FUNCTIONS

Fundamental trigonometrical ratios and functions

1. If $5\tan\theta = 4$, then $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta} =$

(A) 0 (B) 1

(C) 1/6 (D) 6

2. If $\tan\theta = \frac{x\sin\varphi}{1 - x\cos\varphi}$ and $\tan\varphi = \frac{y\sin\theta}{1 - y\cos\theta}$, then $\frac{x}{y} =$

(A) $\frac{\sin\varphi}{\sin\theta}$ (B) $\frac{\sin\theta}{\sin\varphi}$

(C) $\frac{\sin\varphi}{1-\cos\theta}$ (D) $\frac{\sin\theta}{1-\cos\varphi}$

3. If $p = \frac{2\sin\theta}{1 + \cos\theta + \sin\theta}$, and $q = \frac{\cos\theta}{1+\sin\theta}$, then

(A) $pq = 1$ (B) $\frac{q}{p} = 1$

(C) $q - p = 1$ (D) $q + p = 1$

4. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, then

(A) $m^2 - n^2 = 4mn$ (B) $m^2 + n^2 = 4mn$

(C) $m^2 - n^2 = m^2 + n^2$ (D) $m^2 - n^2 = 4\sqrt{mn}$

5. If $\tan\theta = \frac{a}{b}$, then $\frac{\sin\theta}{\cos^8\theta} + \frac{\cos\theta}{\sin^8\theta} =$

(A) $\pm\frac{(a^2+b^2)^4}{\sqrt{a^2+b^2}}\left(\frac{a}{b^8} + \frac{b}{a^8}\right)$ (B) $\pm\frac{(a^2+b^2)^4}{\sqrt{a^2+b^2}}\left(\frac{a}{b^8} - \frac{b}{a^8}\right)$

(C) $\pm\frac{(a^2-b^2)^4}{\sqrt{a^2+b^2}}\left(\frac{a}{b^8} + \frac{b}{a^8}\right)$ (D) $\pm\frac{(a^2-b^2)^4}{\sqrt{a^2-b^2}}\left(\frac{a}{b^8} - \frac{b}{a^8}\right)$

6. If $a\cos\theta + b\sin\theta = m$ and $a\sin\theta - b\cos\theta = n$, then $a^2 + b^2 =$

(A) $m + n$ (B) $m^2 - n^2$

(C) $m^2 + n^2$ (D) None of these

7. The value of $6(\sin^6\theta + \cos^6\theta) - 9(\sin^4\theta + \cos^4\theta) + 4$ is

(A) –3 (B) 0

(C) 1 (D) 3

Sign & trigonometric ratio of allied angles

8. If $\sin\theta = \frac{24}{25}$ and θ lies in the second quadrant, then $\sec\theta + \tan\theta =$

(A) – 3 (B) – 5

(C) – 7 (D) – 9

9. If $\text{cosec}\, A + \cot A = \frac{11}{2}$, then $\tan A =$

(A) $\frac{21}{22}$ (B) $\frac{15}{16}$

(C) $\frac{44}{117}$ (D) $\frac{117}{43}$

10. If $\tan\theta = \frac{20}{21}$, $\cos\theta$ will be

(A) $\pm\frac{20}{41}$ (B) $\pm\frac{1}{21}$

(C) $\pm\frac{21}{29}$ (D) $\pm\frac{20}{21}$

11. If $\sin x = \frac{-24}{25}$, then the value of $\tan x$ is

(A) $\frac{24}{25}$ (B) $\frac{-24}{7}$

(C) $\frac{25}{24}$ (D) None of these

12. The value of $\frac{\cot 54^\circ}{\tan 36^\circ} + \frac{\tan 20^\circ}{\cot 70^\circ}$ is

(A) 2 (B) 3

(C) 1 (D) 0

13. The value of $\sin 10^\circ + \sin 20^\circ + \sin 30^\circ + ... + \sin 360^\circ$ is

(A) 1 (B) 0

(C) – 1 (D) None of these

14. $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + ... + \cos 180^\circ =$

(A) 0 (B) 1

(C) – 1 (D) 2

15. If $\alpha = 22^\circ 30'$, then $(1+\cos\alpha)(1+\cos 3\alpha)(1+\cos 5\alpha)(1+\cos 7\alpha)$ equals

(A) 1/8 (B) 1/4

(C) $\frac{1+\sqrt{2}}{2\sqrt{2}}$ (D) $\frac{\sqrt{2}-1}{\sqrt{2}+1}$

Trigonometrical ratios of sum and difference of two and three angles

16. If $A+B=\frac{\pi}{4}$, then $(1+\tan A)(1+\tan B)=$

(A) 1 (B) 2

(C) ∞ (D) -2

17. $\frac{1}{\sin 10^\circ}-\frac{\sqrt{3}}{\cos 10^\circ}=$

(A) 0 (B) 1

(C) 2 (D) 4

18. If $\cos(A+B)=\alpha\cos A\cos B+\beta\sin A\sin B$, then $(\alpha,\beta)=$

(A) $(-1,-1)$ (B) $(-1,1)$

(C) $(1,-1)$ (D) $(1,1)$

19. $\frac{\sin^2 A-\sin^2 B}{\sin A\cos A-\sin B\cos B}=$

(A) $\tan(A-B)$ (B) $\tan(A+B)$

(C) $\cot(A-B)$ (D) $\cot(A+B)$

20. If $\cos(\alpha+\beta)=\frac{4}{5}, \sin(\alpha-\beta)=\frac{5}{13}$ and α,β lie between 0 and $\frac{\pi}{4}$, then $\tan 2\alpha=$

(A) $\frac{16}{63}$ (B) $\frac{56}{33}$

(C) $\frac{28}{33}$ (D) None of these

21. If $\cos(A-B)=\frac{3}{5}$ and $\tan A\tan B=2$, then

(A) $\cos A\cos B=\frac{1}{5}$ (B) $\sin A\sin B=-\frac{2}{5}$

(C) $\cos A\cos B=-\frac{1}{5}$ (D) $\sin A\sin B=-\frac{1}{5}$

22. $\tan 100^\circ+\tan 125^\circ+\tan 100^\circ\tan 125^\circ=$

(A) 0 (B) 1/2

(C) -1 (D) 1

23. If $\frac{\pi}{2}<\alpha<\pi,\ \pi<\beta<\frac{3\pi}{2};\quad \sin\alpha=\frac{15}{17}$ and $\tan\beta=\frac{12}{5}$, then the value of $\sin(\beta-\alpha)$ is

(A) $-171/221$ (B) $-21/221$

(C) 21/221 (D) 171/221

24. If $\cos x+\cos y+\cos\alpha=0$ and $\sin x+\sin y+\sin\alpha=0$, then $\cot\left(\frac{x+y}{2}\right)=$

(A) $\sin\alpha$ (B) $\cos\alpha$

(C) $\cot\alpha$ (D) $\sin\left(\frac{x+y}{2}\right)$

25. If $\sin\theta+\sin 2\theta+\sin 3\theta=\sin\alpha$ and $\cos\theta+\cos 2\theta+\cos 3\theta=\cos\alpha$, then θ is equal to

(A) $\alpha/2$ (B) α

(C) 2α (D) $\alpha/6$

26. If $\cos A=m\cos B$, then

(A) $\cot\frac{A+B}{2}=\frac{m+1}{m-1}\tan\frac{B-A}{2}$

(B) $\tan\frac{A+B}{2}=\frac{m+1}{m-1}\cot\frac{B-A}{2}$

(C) $\cot\frac{A+B}{2}=\frac{m+1}{m-1}\tan\frac{A-B}{2}$

(D) None of these

27. If $x=\cos 10^\circ\cos 20^\circ\cos 40^\circ$, then the value of x is

(A) $\frac{1}{4}\tan 10^\circ$ (B) $\frac{1}{8}\cot 10^\circ$

(C) $\frac{1}{8}\text{cosec}\,10^\circ$ (D) $\frac{1}{8}\sec 10^\circ$

28. $\sin 12^\circ\sin 24^\circ\sin 48^\circ\sin 84^\circ=$

(A) $\cos 20^\circ\cos 40^\circ\cos 60^\circ\cos 80^\circ$

(B) $\sin 20^\circ\sin 40^\circ\sin 60^\circ\sin 80^\circ$

(C) $\frac{3}{15}$

(D) None of these

29. $\tan 3A-\tan 2A-\tan A=$

(A) $\tan 3A\tan 2A\tan A$

(B) $-\tan 3A\tan 2A\tan A$

(C) $\tan A\tan 2A-\tan 2A\tan 3A-\tan 3A\tan A$

(D) None of these

30. $\cos^2\left(\frac{\pi}{4}-\beta\right)-\sin^2\left(\alpha-\frac{\pi}{4}\right)=$

(A) $\sin(\alpha+\beta)\sin(\alpha-\beta)$

(B) $\cos(\alpha+\beta)\cos(\alpha-\beta)$

(C) $\sin(\alpha-\beta)\cos(\alpha+\beta)$

(D) $\sin(\alpha+\beta)\cos(\alpha-\beta)$

Trigonometrical ratios of multiple and sub-multiple angles

31. $1-2\sin^2\left(\frac{\pi}{4}+\theta\right)=$

(A) $\cos 2\theta$ (B) $-\cos 2\theta$

(C) $\sin 2\theta$ (D) $-\sin 2\theta$

32. $\frac{\sin 3A-\cos\left(\frac{\pi}{2}-A\right)}{\cos A+\cos(\pi+3A)}=$

(A) $\tan A$ (B) $\cot A$

(C) $\tan 2A$ (D) $\cot 2A$

33. If $\tan A=\frac{1}{2}$, then $\tan 3A=$

(A) $\frac{9}{2}$ (B) $\frac{11}{2}$

(C) $\frac{7}{2}$ (D) $-\frac{1}{2}$

34. $\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}=$ (when x lies in IInd quadrant)

(A) $\sin\frac{x}{2}$ (B) $\tan\frac{x}{2}$

(C) $\sec\frac{x}{2}$ (D) $\operatorname{cosec}\frac{x}{2}$

35. $(\sec 2A+1)\sec^2 A=$

(A) $r+R$ (B) $2\sec A$

(C) $\sec 2A$ (D) $2\sec 2A$

36. $\frac{\cos A}{1-\sin A}=$

(A) $\sec A-\tan A$ (B) $\operatorname{cosec} A+\cot A$

(C) $\tan\left(\frac{\pi}{4}-\frac{A}{2}\right)$ (D) $\tan\left(\frac{\pi}{4}+\frac{A}{2}\right)$

37. $\tan\frac{A}{2}$ is equal to

(A) $\pm\sqrt{\frac{1-\sin A}{1+\sin A}}$ (B) $\pm\sqrt{\frac{1+\sin A}{1-\sin A}}$

(C) $\pm\sqrt{\frac{1-\cos A}{1+\cos A}}$ (D) $\pm\sqrt{\frac{1+\cos A}{1-\cos A}}$

38. If $\sin\alpha=\frac{-3}{5}$, where $\pi<\alpha<\frac{3\pi}{2}$, then $\cos\frac{1}{2}\alpha=$

(A) $\frac{-1}{\sqrt{10}}$ (B) $\frac{1}{\sqrt{10}}$

(C) $\frac{3}{\sqrt{10}}$ (D) $\frac{-3}{\sqrt{10}}$

39. Let $0<x<\frac{\pi}{4}$. Then $\sec 2x-\tan 2x=$

(A) $\tan\left(x-\frac{\pi}{4}\right)$ (B) $\tan\left(\frac{\pi}{4}-x\right)$

(C) $\tan\left(x+\frac{\pi}{4}\right)$ (D) $\tan^2\left(x+\frac{\pi}{4}\right)$

40. If $\sin\theta+\cos\theta=x$, then

$\sin^6\theta+\cos^6\theta=\frac{1}{4}[4-3(x^2-1)^2]$ for

(A) All real x (B) $x^2\le 2$

(C) $x^2\ge 2$ (D) None of these

41. $2\cos^2\theta-2\sin^2\theta=1$, then $\theta=$

(A) 15° (B) 30°

(C) 45° (D) 60°

42. If $\sin\alpha=\frac{336}{625}$ and $450°<\alpha<540°$,

then $\sin\left(\frac{\alpha}{4}\right)=$

(A) $\frac{1}{5\sqrt{2}}$ (B) $\frac{7}{25}$

(C) $\frac{4}{5}$ (D) $\frac{3}{5}$

43. If $\tan^2\theta=2\tan^2\varphi+1$, then $\cos 2\theta+\sin^2\varphi$ equals

(A) –1 (B) 0

(C) 1 (D) None of these

44. $\cos^4\frac{\pi}{8}+\cos^4\frac{3\pi}{8}+\cos^4\frac{5\pi}{8}+\cos^4\frac{7\pi}{8}=$

(A) $\frac{1}{2}$ (B) $\frac{1}{4}$

(C) $\frac{3}{2}$ (D) $\frac{3}{4}$

45. If $\sin x+\cos x=\frac{1}{5}$, then $\tan 2x$ is

(A) $\frac{25}{17}$ (B) $\frac{7}{25}$

(C) $\frac{25}{7}$ (D) $\frac{24}{7}$

Maximum & minimum values of trigonometrical functions, conditional trigonometrical identities

46. If $x+y+z=180^o$,

then $\cos 2x+\cos 2y-\cos 2z$ is equal to

(A) $4\sin x.\sin y.\sin z$

(B) $1-4\sin x.\sin y.\cos z$

(C) $3\cos\theta-4\sin\theta$

(D) $\cos A.\cos B.\cos C$

47. If $\alpha+\beta+\gamma=2\pi$, then

(A) $\tan\frac{\alpha}{2}+\tan\frac{\beta}{2}+\tan\frac{\gamma}{2}=\tan\frac{\alpha}{2}\tan\frac{\beta}{2}\tan\frac{\gamma}{2}$

(B) $\tan\frac{\alpha}{2}\tan\frac{\beta}{2}+\tan\frac{\beta}{2}\tan\frac{\gamma}{2}+\tan\frac{\gamma}{2}\tan\frac{\alpha}{2}=1$

(C) $\tan\frac{\alpha}{2}+\tan\frac{\beta}{2}+\tan\frac{\gamma}{2}=-\tan\frac{\alpha}{2}\tan\frac{\beta}{2}\tan\frac{\gamma}{2}$

(D) None of these

48. If $A+B+C=\pi$,

then $\cos 2A+\cos 2B+\cos 2C=$

(A) $1+4\cos A\cos B\sin C$

(B) $-1+4\sin A\sin B\cos C$

(C) $-1-4\cos A\cos B\cos C$

(D) None of these

49. If $A+B+C=180^o$,

then $\frac{\sin 2A+\sin 2B+\sin 2C}{\cos A+\cos B+\cos C-1}=$

(A) $8\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}$ (B) $8\cos\frac{A}{2}\cos\frac{B}{2}\cos\frac{C}{2}$

(C) $8\sin\frac{A}{2}\cos\frac{B}{2}\cos\frac{C}{2}$ (D) $8\cos\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}$

50. A, B, C are the angles of a triangle, then $\sin^2 A+\sin^2 B+\sin^2 C-2\cos A\cos B\cos C=$

(A) 1 (B) 2

(C) 3 (D) 4

51. If $\cos A=\cos B\cos C$ and $A+B+C=\pi$, then the value of $\cot B\cot C$ is

(A) 1 (B) 2

(C) $\frac{1}{3}$ (D) $\frac{1}{2}$

52. If $A+B+C=180^o$, then the value of $(\cot B+\cot C)\ (\cot C+\cot A)\ (\cot A+\cot B)$ will be

(A) $\sec A\sec B\sec C$

(B) $\operatorname{cosec} A\operatorname{cosec} B\operatorname{cosec} C$

(C) $\tan A\tan B\tan C$

(D) 1

53. If $A+B+C=180^o$, then the value of $\cot\frac{A}{2}+\cot\frac{B}{2}+\cot\frac{C}{2}$ will be

(A) $2\cot\frac{A}{2}\cot\frac{B}{2}\cot\frac{C}{2}$ (B) $4\cot\frac{A}{2}\cot\frac{B}{2}\cot\frac{C}{2}$

(C) $\cot\frac{A}{2}\cot\frac{B}{2}\cot\frac{C}{2}$ (D) $8\cot\frac{A}{2}\cot\frac{B}{2}\cot\frac{C}{2}$

54. If $A+B+C=270^o$, then

$\cos 2A+\cos 2B+\cos 2C+4\sin A\sin B\sin C=$

(A) 0 (B) 1

(C) 2 (D) 3

55. If $A+B+C=180^o$, then $\sum\tan\frac{A}{2}\tan\frac{B}{2}=$

(A) 0 (B) 1

(C) 2 (D) 3

56. If $A+B+C=\pi\,(A,B,C>0)$ and the angle C is obtuse then

(A) $\tan A\tan B>1$ (B) $\tan A\tan B<1$

(C) $\tan A\ \tan B=1$ (D) None of these

57. If $A,\ B,\ C$ are acute positive angles such that $A+B+C=\pi$ and $\cot A\cot B\cot C=K$, then

(A) $K\le\frac{1}{3\sqrt{3}}$ (B) $K\ge\frac{1}{3\sqrt{3}}$

(C) $K<\frac{1}{9}$ (D) $K>\frac{1}{3}$

General Solution of Standard Trigonometrical Equations

58. If $\tan 2\theta\tan\theta=1$, then the general value of θ is

(A) $\left(n+\frac{1}{2}\right)\frac{\pi}{3}$ (B) $\left(n+\frac{1}{2}\right)\pi$

(C) $\left(2n\pm\frac{1}{2}\right)\frac{\pi}{3}$ (D) None of these

59. If $1+\cot\theta=\operatorname{cosec}\theta$, then the general value of θ is

(A) $n\pi+\frac{\pi}{2}$ (B) $2n\pi-\frac{\pi}{2}$

(C) $2n\pi+\frac{\pi}{2}$ (D) None of these

60. If $\cos 7\theta=\cos\theta-\sin 4\theta$, then the general value of θ is

(A) $\frac{n\pi}{4},\frac{n\pi}{3}+\frac{\pi}{18}$ (B) $\frac{n\pi}{3},\frac{n\pi}{3}+(-1)^n\frac{\pi}{18}$

(C) $\frac{n\pi}{4},\frac{n\pi}{3}+(-1)^n\frac{\pi}{18}$ (D) $\frac{n\pi}{6},\frac{n\pi}{3}+(-1)^n\frac{\pi}{18}$

61. If $\frac{1-\tan^2\theta}{\sec^2\theta}=\frac{1}{2}$, then the general value of θ is

(A) $n\pi\pm\frac{\pi}{6}$ (B) $n\pi+\frac{\pi}{6}$

(C) $2n\pi\pm\frac{\pi}{6}$ (D) None of these

62. If $\cos\theta+\sec\theta=\frac{5}{2}$, then the general value of θ is

(A) $n\pi\pm\frac{\pi}{3}$ (B) $2n\pi\pm\frac{\pi}{6}$

(C) $n\pi\pm\frac{\pi}{6}$ (D) $2n\pi\pm\frac{\pi}{3}$

63. If $\cot\theta+\tan\theta=2\operatorname{cosec}\theta$, the general value of θ is

(A) $n\pi\pm\frac{\pi}{3}$ (B) $n\pi\pm\frac{\pi}{6}$

(C) $2n\pi\pm\frac{\pi}{3}$ (D) $2n\pi\pm\frac{\pi}{6}$

64. The most general value of θ satisfying the equations $\sin\theta=\sin\alpha$ and $\cos\theta=\cos\alpha$ is

(A) $2n\pi+\alpha$ (B) $2n\pi-\alpha$

(C) $n\pi+\alpha$ (D) $n\pi-\alpha$

65. The solution of the equation

$$\begin{vmatrix}\cos\theta & \sin\theta & \cos\theta\\ -\sin\theta & \cos\theta & \sin\theta\\ -\cos\theta & -\sin\theta & \cos\theta\end{vmatrix}=0,\ \text{is}$$

(A) $\theta=n\pi$ (B) $\theta=2n\pi\pm\frac{\pi}{2}$

(C) $\theta=n\pi\pm(-1)^n\frac{\pi}{4}$ (D) $\theta=2n\pi\pm\frac{\pi}{4}$

66. The set of values of x for which the expression $\frac{\tan 3x-\tan 2x}{1+\tan 3x\tan 2x}=1$, is

(A) φ

(B) $\frac{\pi}{4}$

(C) $\left\{n\pi+\frac{\pi}{4}:n=1,2,3.....\right\}$

(D) $\left\{2n\pi+\frac{\pi}{4}:n=1,2,3.....\right\}$

67. If $\tan\theta + \tan 2\theta + \sqrt{3}\tan\theta\tan 2\theta = \sqrt{3}$, then

(A) $\theta = (6n+1)\pi/18, \forall n \in I$

(B) $\theta = (6n+1)\pi/9, \forall n \in I$

(C) $\theta = (3n+1)\pi/9, \forall n \in I$

(D) None of these

General Solution of Square of Trigonometric Equations

68. If $\frac{1-\cos 2\theta}{1+\cos 2\theta} = 3$, then the general value of θ is

(A) $2n\pi \pm \frac{\pi}{6}$ (B) $n\pi \pm \frac{\pi}{6}$

(C) $2n\pi \pm \frac{\pi}{3}$ (D) $n\pi \pm \frac{\pi}{3}$

69. If $\tan^2\theta - (1+\sqrt{3})\tan\theta + \sqrt{3} = 0$, then the general value of θ is

(A) $n\pi + \frac{\pi}{4}, n\pi + \frac{\pi}{3}$ (B) $n\pi - \frac{\pi}{4}, n\pi + \frac{\pi}{3}$

(C) $n\pi + \frac{\pi}{4}, n\pi - \frac{\pi}{3}$ (D) $n\pi - \frac{\pi}{4}, n\pi - \frac{\pi}{3}$

70. If $4\sin^4 x + \cos^4 x = 1$, then $x =$

(A) $n\pi$ (B) $n\pi \pm \sin^{-1}\frac{2}{5}$

(C) $n\pi + \frac{\pi}{6}$ (D) None of these

71. If $\cos 3x + \sin\left(2x - \frac{7\pi}{6}\right) = -2$,

then $x =$ (where $k \in Z$)

(A) $\frac{\pi}{3}(6k+1)$ (B) $\frac{\pi}{3}(4k+1)$

(C) $\frac{\pi}{3}(2k+1)$ (D) None of these

72. $2\sin^2 x + \sin^2 2x = 2, -\pi < x < \pi$, then $x =$

(A) $\pm\frac{\pi}{6}$ (B) $\pm\frac{\pi}{4}$

(C) $\frac{3\pi}{2}$ (D) None of these

73. The values of θ satisfying

$\sin 7\theta = \sin 4\theta - \sin\theta$ and $0 < \theta < \frac{\pi}{2}$ are

(A) $\frac{\pi}{9}, \frac{\pi}{4}$ (B) $\frac{\pi}{3}, \frac{\pi}{9}$

(C) $\frac{\pi}{6}, \frac{\pi}{9}$ (D) $\frac{\pi}{3}, \frac{\pi}{4}$

74. The expression $(1+\tan x+\tan^2 x)(1-\cot x+\cot^2 x)$ has the positive values for x, given by

(A) $0 \le x \le \frac{\pi}{2}$ (B) $0 \le x \le \pi$

(C) For all $x \in R$ (D) $x \ge 0$

75. If $5\cos 2\theta + 2\cos^2\frac{\theta}{2} + 1 = 0, -\pi < \theta < \pi$, then $\theta =$

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{3}, \cos^{-1}\frac{3}{5}$

(C) $\cos^{-1}\frac{3}{5}$ (D) $\frac{\pi}{3}, \pi - \cos^{-1}\frac{3}{5}$

76. If $\cos\theta = \frac{-1}{2}$ and $0^o < \theta < 360^o$, then the values of θ are

(A) 120^o and 300^o (B) 60^o and 120^o

(C) 120^o and 240^o (D) 60^o and 240^o

General Solution of Trigonometric Equation $a\cos\theta + b\sin\theta = c$

77. The equation a sin x + b cos x = c, where |c| > $\sqrt{a^2+b^2}$ has-

(A) A unique solution

(B) Infinite no. of solutions

(C) No solution

(D) None of these

78. General solution of $\sin^3 x + \cos^3 x + \frac{3}{2}\sin 2x = 1$

(A) $x = n\pi$ when n is even integer

(B) $x = n\pi +$ when n is odd integer

(C) $x = 2n\pi$ when n is odd integer

(D) $x = n\pi -$ when n is even integer

79. The smallest angle of the triangle whose sides are is $6+\sqrt{12}, \sqrt{48}, \sqrt{24}$

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{6}$

(C) $\frac{\pi}{3}$ (D) $\frac{\pi}{2}$

80. In a ΔABC, 2s = perimeter and R circumradius. Then s/R is equal to-

(A) sin A + sin B + sin C

(B) cos A + cos B + cos C

(C) $\sin\frac{A}{2}+\sin\frac{B}{2}+\sin\frac{C}{2}$

(D) none of these

81. If R denotes circumradius then in a ΔABC, $\frac{b^2-c^2}{2aR}$ is equal to-

(A) cos (B – C) (B) sin(B – C)

(C) cos B – cos C (D) none of these

82. The ratio of the circumradius and inradius of an equilateral triangle is-

(A) 3 : 1 (B) 1 : 2

(C) 2 : $\sqrt{3}$ (D) 2 : 1

83. In and equilateral triangle, the in radius, circum-radius and one of the ex-radii are in the ratio-

(A) 2 : 3 : 5 (B) 1 : 2 : 3

(C) 3 : 7 : 9 (D) 3 : 7 : 9

84. If the exradii of a triangle are in HP the corresponding sides are in-

(A) A.P. (B) G.P.

(C) H.P. (D) none of these

85. In triangle ABC, if $\frac{\cos A}{a}=\frac{\cos B}{b}=\frac{\cos C}{c}$ and a = 2, then area of this triangle is-

(A) 1 (B) 2

(C) $\sqrt{3}/2$ (D) $\sqrt{3}$

86. In triangle ABC, if b = 3, c = 4 and $\angle B = \pi/3$, then number of such triangles is-

(A) 1 (B) 2

(C) 0 (D) infinte

87. Radius of the incircle of the triangle with side 18, 24, 30 cms is-

(A) 2 (B) 4

(C) 6 (D) 9

88. In triangle ABC, with general notions $r_1 + r_2 + r_3 - r$ is equal to

(A) 4R (B) Δ^2

(C) Δ (D) 2R

89. In triangle ABC, cos A + cos B + cos C is equal to-

(A) 1 + R/r (B) 1 + r/R

(C) 1 – R/r (D) 1 – r/R

90. In triangle ABC if a, b, c are in AP, then $\tan\frac{A}{2}, \tan\frac{B}{2}, \tan\frac{C}{2}$ will be in

(A) A.P. (B) G.P.

(C) H.P. (D) none of these