Inverse trigonometric functions &
General Solution of Trigonometric Equations.

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1. Sin ($\frac{1}{2}\sin^{-1}\frac{8}{17}$) =

a) $\sqrt{17}$ **b)** $\frac{1}{\sqrt{17}}$ **c)** $\frac{15}{17}$ **d)** $\frac{8}{17}$

2. The value of Tan ($\frac{\pi}{4}$ - $\tan^{-1}\frac{1}{8}$) =

a) $\frac{7}{8}$ b) $\frac{7}{9}$ c) $\frac{7}{10}$ d) $\frac{9}{7}$

3. The domain of the function

f(x) = $\sin^{-1}\left[log_2\left(\frac{x^2}{2}\right)\right]$ **is**

a) $1 \le x \le 2$ b) $-1 \le x \le 2$ c) $2 \le x \le 4$ d) $1 \le x \le 5$

4. If cos ($3\cos^{-1}x$) = tan ($\tan^{-1}x$) then x =

a) 0 b) 1 c) -1 d) 0,1, -1

5. If $\sin^{-1}a$ **=** $\alpha + \beta$ **and** $cos(\alpha - \beta) = \sqrt{1-b^2}$
then $\sin^2\alpha + \cos^2\beta$ **=**

a) 1 + a b) a + b c) 1 + ab d) 1+ b

6. If $\sin^{-1}x + \cos^{-1}(1-x) = \sin^{-1}(-x)$ **then x satisfies**

a) $2x^2 + 3x + 1 = 0$ b) $2x^2 - 3x = 0$
c) $2x^2 + x - 1 = 0$ d) $2x^2 + x + 1 = 0$

7. If $\sec^{-1}x = \text{cosec}^{-1}y$ **then** $\sin^{-1}(\frac{1}{x}) + \sin^{-1}(\frac{1}{y})$ **=**

a) Π b) π / 2 c) - π /2 d) - π

8. If tan ax – tan bx = 0 (a ≠ b) then the values of x form a series in

a) AP b) G P c) H P d) AGP.

9. If $\sin^{-1}(\frac{1}{3}) + \sin^{-1}(\frac{2}{3}) = \sin^{-1}(x)$ **then x =**

a) 0 **b)** $\frac{(\sqrt{5}-4\sqrt{2})}{9}$ **c)** $\frac{(\sqrt{5}+4\sqrt{2})}{9}$ **d) π / 2 .**

10. The value of $\tan^{-1}5 + \tan^{-1}3 - \cot^{-1}\frac{4}{7}$ **=**

a) $\frac{\pi}{4}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{2}$ d) $\frac{\pi}{6}$.

11. Two angles of a triangle are $\cot^{-1}2$ and $\cot^{-1}3$, then the third angle is

a) $\frac{\pi}{4}$ b) $\frac{3\pi}{4}$ c) π d) $-\frac{\pi}{2}$.

12. **The value of $\sin^{-1}(\cos\left(\sin^{-1}(x)\right) + \cos^{-1}(\sin(\cos^{-1}(x)) =$**

a) **0** **b)** $\frac{\pi}{4}$ **c)** $\frac{\pi}{2}$ **d)** π

13. If $\cos^{-1}x$ - $\sin^{-1}x$ = $\sin^{-1}(1-x)$ then the values of x are

a) 0 or ½ b) 1 or 1/3 c) -1 or -1/3 d) -1 ,1/2

14. If $\cos^{-1}x$ + $\sin^{-1}\frac{x}{2}$ = $\frac{\pi}{6}$ then x =

a) $\pm\sqrt{3}$ b) 1 c) $\frac{1}{\sqrt{2}}$ d) 0

15. The value of $\cot^{-1}21$ + $\cot^{-1}13$ + $\cot^{-1}(-8)$ =

a) 0 b) $\cot^{-1}26$ c) $\cot^{-1}1$ d) $\cot^{-1}1$

16. If $\sin^{-1}\left(x-\frac{x^2}{2}+\frac{x^4}{4}-\ldots\right)$ + $\cos^{-1}\left(x^2-\frac{x^4}{2}+\frac{x^6}{4}-\cdots.\right)$ = $\frac{\pi}{2}$ for 0< |x| < $\sqrt{2}$ then x =

a) 1 b) $\frac{1}{2}$ 3) 0 d) $-\frac{1}{2}$

17. The value of $2\tan^{-1}[\text{cosec}(\tan^{-1}x) - \tan(\cot^{-1}x)]$ =

a) $\cot^{-1}(x)$ b) $\tan^{-1}x$ c) $\sin^{-1}x$ d) $\cos^{-1}x$

18. If $2\sin^{-1}x = \sin^{-1}2x\sqrt{1-x^2}$, then x is in

a) [-1, 1] b) [$-\frac{1}{2}$, 1] c) [$-\frac{1}{\sqrt{2}}$, $\frac{1}{\sqrt{2}}$] d) [0, 1] .

19. The solution set of the equation $\sin^{-1}x$ = 2 $\tan^{-1}x$ is

a) { 1, 2} b) { -1, 2} c) {-1, 1, 0} d) {1, ½ , 0}

20. If in a triangle ABC , C is 90^0, then $\tan^{-1}\frac{a}{b+c}$ + $\tan^{-1}\frac{b}{c+a}$ =

a) $\frac{\pi}{2}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{4}$ d) $\frac{\pi}{6}$

21. The value of $\tan[\tan^{-1}(\frac{1}{a+b}) + \tan^{-1}(\frac{b}{a^2+ab+1})] =$

a) a b) $\frac{1}{a}$ c) b d) $\frac{1}{b}$

22. If a_1, a_2, a_3 ....a_n is an AP with common difference d , then

$\tan\{\tan^{-1}\left(\frac{d}{1+a_1a_2}\right) + \tan^{-1}\left(\frac{d}{1+a_2a_3}\right) +.....+ \tan^{-1}\left(\frac{d}{1+a_{n-1}a_n}\right)\} =$

a) $\frac{(n+1)d}{1+a_1 a_n}$ b) $\frac{(n-1)d}{1+a_1 a_n}$ c) $\frac{nd}{1+a_1 a_n}$ d) $\frac{(n+1)d}{a_1+a_n}$

23. If $(\tan^{-1} x)^2 + (\cot^{-1} x)^2 = \frac{5\pi^2}{8}$ then x =

a) 0 b) 1 c) $\sqrt{2}$ -1 d) -1

24. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \pi$, then

$\sum X\sqrt{1-x^2}$ =

a) $x + y + z$ b) 2xyz

c) 2(x+ y + z) d) $x^2y^2z^2$

25. If tan(x + y) = 33 and $x = \tan^{-1} 3$ then y =

a) $\frac{\pi}{4}$ b) $\tan^{-1} 30$ c) $\tan^{-1}\frac{33}{10}$ d) $\tan^{-1}\frac{3}{10}$

26. $2\sin^{-1}\sqrt{\frac{1-x}{2}}$ with $|x| \leq 1$ =

a) $\frac{\pi}{2} + \sin^{-1} 2x$ b) $\cos^{-1} 2x$ c) $\cos^{-1} x$ d) $\tan^{-1}(1-x)$

27. The general solution of sin5x = k where k is a real root of $2x^3 - x^2 + 2x - 1 = 0$ is given by

a) $x = \frac{n\pi}{5} + (-1)^n \frac{\pi}{30}$ (b) $x = \frac{n\pi}{5} + (-1)^n \frac{\pi}{15}$

(c) $x = \frac{n\pi}{5} + (-1)^n \frac{\pi}{20}$ (d) $x = n\pi + (-1)^n \frac{\pi}{6}$

28. If $5\cos 2\theta + 2\cos^2\frac{\theta}{2} + 1 = 0$, $\theta \varepsilon (-\pi, \pi)$,then θ =

a) $\frac{\pi}{3}$ (b) $\frac{\pi}{3}$, $\cos^{-1}\frac{3}{5}$ c) $\cos^{-1}\frac{3}{5}$ (d) $\frac{\pi}{3}$, $\pi - \cos^{-1}\frac{3}{5}$

29. **If The general solution of $\frac{1-\cos 2\theta}{1+\cos 2\theta} = 3$ is given by θ =**

a) $2n\pi \pm \frac{\pi}{6}$ (b) $n\pi \pm \frac{\pi}{6}$

(c). $2n\pi \pm \frac{\pi}{3}$ (b) $n\pi \pm \frac{\pi}{3}$

30. If Sec x cos5x + 1 =0 where 0<x < 2 π , then x is equal to :

a) $\frac{\pi}{5}, \frac{\pi}{4}$ b) $\frac{\pi}{5}$

c) $\frac{\pi}{4}$ d) none of these

31. The solution of the equation $\sin^{10}2x = 1 + \cos^{10}x$ is

a) x = (2n + 1)$\frac{\pi}{2}$, n Є Z (b) x = n **π** , n Є Z

.(C) x= (2n + 1)$\frac{\pi}{4}$, n Є Z (d) no solution.

32. The most general value of θ satisfying the equation $(1 + 2\sin\theta)^2 + (\sqrt{3}\tan\theta - 1)^2 = 0$ are given by

a) n **π** ± $\frac{\pi}{6}$ b) n **π** + (-1) ^{n} $\frac{7\pi}{6}$

c). 2n **π** + $\frac{7\pi}{6}$ (d) 2n **π** + $\frac{11\pi}{6}$

33. The most general solution of θ satisfying

Tan θ + tan($\frac{3\pi}{4}$ + θ) = 2 is / are

a) n **π** ± $\frac{\pi}{3}$, n Є Z . b) 2n **π** + $\frac{\pi}{3}$, n Є Z

.c) 2n **π** ± $\frac{\pi}{3}$, n Є Z d)) 2n **π** +(-1) ^{n} $\frac{\pi}{3}$, n Є Z

34. The general solution of x for which cos2x , $\frac{1}{2}$, and sin 2x are in Ap , are given by

a) n **π** , n **π** + $\frac{\pi}{2}$ b) n **π** , n **π** + $\frac{\pi}{4}$ c) n **π** + $\frac{\pi}{4}$, $\frac{3n\pi}{4}$ d) none of these.

35. If $\sqrt{2}$ sec θ + tan θ =1 then the general solution of θ=

a) n **π** + $\frac{3\pi}{4}$ b) 2n **π** + $\frac{\pi}{4}$ c) 2n **π** - $\frac{\pi}{4}$ d) 2n **π** ± $\frac{\pi}{4}$

36. The equation $\sin\frac{3x}{2}\cos\frac{3x}{2} + 1 = 0$ has

a) one solution b) two solutions

c) infinite solutions d) no solution.

37. The general solution of $e^{\frac{-1}{\sqrt{2}}}(e^{\sin x} + e^{\cos x}) = 2$ is

a) x = n **π** b) x = (4n + 1) $\frac{\pi}{4}$

c) x = (4n + 1) $\frac{\pi}{2}$ d) n **π** + $\frac{\pi}{6}$.

38. If – π ≤ x ≤Π ,– π ≤ y ≤Π and

cos x + cosy = 2 then general solution is x =

a) 2 n **π** + y b) 2 n **π** - y

c) n **π** + y d) n **π** + (-1) ^{n} y.

39. The equation 3 $\sin^2 x$ + 10cosx – 6 =0 is satisfied if

a) x = n **π** ± $\cos^{-1}\frac{1}{3}$ b) x = 2n **π** ± $\cos^{-1}\frac{1}{3}$

c) x = n **π** ± $\cos^{-1}\frac{1}{6}$ b) x = 2n **π** ± $\cos^{-1}\frac{1}{6}$

40. If tan2x = tan $\frac{2}{x}$, then the value of x =

a) $\frac{n\pi \pm\sqrt{n^2\pi^2+ 16}}{4}$ b) $\frac{n\pi}{4}$

c) $\frac{n\pi \pm\sqrt{n^2\pi^2- 16}}{4}$ d) None of these

41. If the equation cos3x$\cos^3 x$ + sin3x $\sin^3 x$= 0., then x =

a) (2n+1) $\frac{\pi}{4}$ b) (2n - 1) $\frac{\pi}{4}$ c) $\frac{n\pi}{4}$ d) n **π** , $\frac{n\pi}{2}$.

42. If x ≠ $\frac{n\pi}{2}$ and $\cos x^{\sin^2 x - 3\sin x + 2}$ = 1 , then all solutions of x are given by

a) 2n **π** + $\frac{\pi}{2}$ b) (2n + 1) **π** - $\frac{\pi}{2}$

c) 2n **π** + $(-1)^n\frac{\pi}{2}$ d) None of these.

43. If 1 + sin x + $\sin^2 x$ + $\sin^3 x$ +.....∞ = 4 + 2$\sqrt{3}$ with 0<x < π and x ≠ $\frac{\pi}{2}$, then x =

a) $\frac{\pi}{6}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{3}$ or $\frac{\pi}{6}$ d) $\frac{\pi}{3}$ or $\frac{2\pi}{3}$

44. The general solution of of $\tan^2 x$ = cos2x – 1 is

a) 2n **π** b) $\frac{n\pi}{2}$ c) n **π** d) (2n + 1) **π**

45. Cot θ =sin2 θ (θ ≠ n π),if θ =

a) $\frac{\pi}{4}$, $\frac{\pi}{3}$ b) $\frac{\pi}{4}$, $\frac{\pi}{2}$ c) $\frac{\pi}{4}$ only d) $\frac{\pi}{2}$ only

46. If sin($\frac{\pi}{4}$ cotθ) =cos($\frac{\pi}{4}$ tanθ) then the value of θ =

a)n **π** + $\frac{\pi}{4}$ b) 2n **π** ± $\frac{\pi}{4}$ c) n **π** - $\frac{\pi}{4}$ d) 2n **π** ± $\frac{\pi}{6}$

47. If tan θ + 3 cot θ = 5 sec θ then θ =

a) n **π** + (-1)^n $\frac{\pi}{4}$, n∈ Z . b) n **π** + (-1)^n $\frac{\pi}{6}$, n∈ Z

c) n **π** + (-1)$^{n+1}$ $\frac{\pi}{6}$, n∈ Z or n **π** + (-1)^n $\frac{\pi}{3}$, n∈ Z

d) n **π** + (-1)^n $\frac{\pi}{2}$, n∈ Z or n **π** + (-1)^n $\frac{\pi}{6}$, n∈ Z

48. If tanx + tan4x + tan7x = tanx tan4x tan7x then x =

a) n **π** / 3 b) n **π** / 4 c) n **π** / 6 d) n **π** / 12

49. The general solution of sinx + sin7x = sin4x in (0, $\frac{\pi}{2}$) are

a) $\frac{\pi}{4}$, $\frac{\pi}{10}$ b) $\frac{\pi}{4}$, $\frac{\pi}{3}$ c) $\frac{\pi}{4}$, $\frac{\pi}{2}$ d) $\frac{\pi}{4}$, $\frac{\pi}{9}$

50. The number of solutions of cosx = $|1 + sinx|$, 0≤x≤ 3 π is

a) 3 b) 2 c) 4 d) 5

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

a) φ b) { n π + $\frac{\pi}{4}$, n ∈ Z } c) $\frac{\pi}{4}$ d) { 2n π + $\frac{\pi}{4}$, n ∈ Z }

52. The general solution of cos7 θ cos 5 θ = cos3θ cosθ is

a) $\frac{n\pi}{8}$, $\frac{n\pi}{12}$ **b)** $\frac{n\pi}{5}$, $\frac{n\pi}{3}$ **c)** $\frac{n\pi}{8}$, $\frac{n\pi}{4}$ **d)** $\frac{n\pi}{5}$, $\frac{n\pi}{6}$

53. If sec^{2}x + + cosec^{2}x = 4 , then the value of x is

a) $\frac{\pi}{3}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

54. The equation 2 sin θ cos θ = x ^{2} + $\frac{1}{x^2}$ has

a) one real solution b) no solution

c) two real solutions d) θ = n **π** .

55. If A and B are acute angles such that sinA = sin^{2}B and 2 cos^{2}A = 3 cos^{2}B then A is

a) $\frac{\pi}{6}$ **b)** $\frac{\pi}{12}$ **c)** $\frac{\pi}{3}$ **d)** $\frac{\pi}{4}$

56. Let n be a positive integer such that sin$\frac{\pi}{2n}$ + cos$\frac{\pi}{2n}$ = $\frac{\sqrt{n}}{2}$,then

a) n = 4 b) n= 1,2,3,4,..... c) n = 2 d) n = 6

57. If $\sin 40^0 = k$ and $\cos x = 1 - 2k^2$ then the value of x in (0^0, 360^0) are

a) 40^o and 140^o b) 80^o and 280^o

c) 40^o and 220^o d) 80^o and 260^o

58. If $3\cos^2 x - 2\sqrt{3}\cos x \sin x - 3\sin^2 x = 0$ then x =

a) $\frac{n\pi}{2} + \frac{\pi}{6}$ b) $\frac{n\pi}{2} + \frac{\pi}{12}$ c) $\frac{n\pi}{2}$ d) $n\pi + \frac{\pi}{3}$

59. The most general solution of $\log_{\cos x}(\tan x) + \log_{\sin x}(\cot x) = 0$

a) $2n\pi + \frac{\pi}{4}$, $n \in Z$, b) $n\pi + \frac{\pi}{4}$, $n \in Z$

c) $2n\pi - \frac{3\pi}{4}$, $n \in Z$ d) $n\pi - \frac{3\pi}{4}$, $n \in Z$

60. The general solution of $3\tan(\theta - 15^o) = \tan(\theta + 15^o)$ is

a) $\theta = \frac{n\pi}{2} \pm \frac{\pi}{4}$ b) $n\pi \pm \frac{\pi}{4}$ c) $\frac{n\pi}{2} + (-1)^n \frac{\pi}{4}$ d) $2n\pi - \frac{\pi}{4}$

61. The most general solution of $\sqrt{3}\tan\theta + 1 = 0$ & $\sqrt{3}\sec\theta - 2 = 0$ is

a) $2n\pi - \frac{\pi}{6}$ b) $2n\pi + \frac{11\pi}{6}$

c) $n\pi + (-1)^n \frac{11\pi}{6}$ d) $2n\pi + \frac{7\pi}{6}$

62. If $\cos x + \cos y = 1$ and $\cos x \cos y = \frac{1}{4}$ then the general solutions are

a) $x = 2n\pi \pm \frac{\pi}{4}$, $y = 2k\pi \pm \frac{\pi}{4}$ b) $2n\pi \pm \frac{\pi}{3}$, $y = 2k\pi \pm \frac{\pi}{3}$

c) $x = 2n\pi \pm \frac{\pi}{6}$, $y = 2k\pi \pm \frac{\pi}{6}$ b) $n\pi \pm \frac{\pi}{3}$, $y = k\pi \pm \frac{\pi}{3}$

63. $\tan^{-1}\left(\frac{1+\sin x}{\cos x}\right)$ =

a) $\frac{\pi}{4} - \frac{x}{2}$ b) $\frac{\pi}{2} - \frac{x}{2}$ c) $\frac{\pi}{4} + \frac{x}{2}$ d) $\frac{x}{2}$

64 . $\tan\left[\frac{\pi}{4} + \frac{1}{2}\cos^{-1}(x)\right] + \tan\left[\frac{\pi}{4} - \frac{1}{2}\cos^{-1}(x)\right]$ with $x \neq 0$

a) 2x b) $\frac{2}{x}$ c) 2x d) $2\sqrt{1+x^2}$

65. If $\sin^{-1}\left(\frac{x}{5}\right) + \operatorname{cosec}^{-1}\left(\frac{5}{4}\right) = \frac{\pi}{2}$, then x =

a) 4 b) 5 c) 1 d) 3

66. The value of $\cos(2\cos^{-1}x + \sin^{-1}x)$ at x = 1/5 is

a) $\frac{\sqrt{6}}{5}$ b) $\frac{-2\sqrt{6}}{5}$ c) $\frac{2}{5}$ d) $2\sqrt{6}$

67. The general solution of cosecx + cotx = $\sqrt{3}$ is

a) x = 2n $\pi \pm \frac{2\pi}{3}$ b) x = $\frac{n\pi}{2} + \frac{2\pi}{3} - \frac{\pi}{3}$

c) x = $\frac{n\pi}{2} - \frac{2\pi}{3}$ d) x = 2n $\pi \pm \frac{2\pi}{3} - \frac{\pi}{3}$

68. If α, β and γ are the roots of the equation $x^3 + m x^2 + 3x + m = 0$, then the general solution of $\tan^{-1}\alpha + \tan^{-1}\beta + \tan^{-1}\gamma =$

a) $(2n + 1)\frac{\pi}{2}$ b) n π c) $\frac{n\pi}{2}$ d) depend upon the value of x .

69. The equation 3 cosx + 4 sinx = 6 has

a) finite solution b) infinite solution

c) one solution d) no solution .

70. The value of x satisfying the equation sinx + $\frac{1}{\sin x} = \frac{7}{2\sqrt{3}}$ is given by

a) 10^0 b) 30^0 c) 45^0 d) 60^0

71. If $\log_5(1 + \sin x) + \log_5(1 - \sin x) = 0$ then x in (0, π) is

a) $\frac{\pi}{2}$ b) 0 c) π d) No value

72. If y = cosx and y = sin 5x then x =

a) $\frac{\pi}{4}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{12}$ d) $\frac{\pi}{2}$

73. The value of $\cos^{-1}\left(\cos\left(\frac{5\pi}{3}\right)\right) + \sin^{-1}\left(\sin\left(\frac{5\pi}{3}\right)\right) =$

a) $\frac{\pi}{2}$ b) $\frac{5\pi}{3}$ c) $\frac{10\pi}{3}$ d) 0

74. If $\theta = \sin^{-1}\sin(-600^0))$, then one of the possible value of θ is

a) $\frac{\pi}{3}$ b) $\frac{\pi}{2}$ c) $\frac{2\pi}{3}$ d) $-\frac{2\pi}{3}$

75. The value of $\sin(2\sin^{-1}0.8))$ =

a) 0.96 b) 0.86 c) 0.94 d) 0. 84.