# TRIGONOMETRIC EQUATION
# DPP - 1

**1.** General solution of tan $5\theta$ = cot $2\theta$ is

(A) $\theta = \frac{n\pi}{7} + \frac{\pi}{14}$ (B) $\theta = \frac{n\pi}{7} + \frac{\pi}{5}$ (C) $\theta = \frac{n\pi}{7} + \frac{\pi}{2}$ (D) $\theta = \frac{n\pi}{7} + \frac{\pi}{3}$, $n \in Z$

**2.** The general solution of the equation cos x + sec x = 2 is given by-

(A) $2n\pi$ ; $n \in I$ (B) $n\pi$; $n \in I$ (C) $\frac{n\pi}{4}$; $n \in I$ (D) $\frac{n\pi}{2}$; $n \in I$

**3.** If $2\tan^2\theta = \sec^2\theta$, then the general value of $\theta$ is

(A) $n\pi + \frac{\pi}{4}$; $n \in I$ (B) $n\pi - \frac{\pi}{4}$ ; $n \in I$

(C) $n\pi \pm \frac{\pi}{4}$; $n \in I$ (D) $2n\pi \pm \frac{\pi}{4}$; $n \in I$

**4.** The solution set of (2 cos x – 1) (3 + 2 cos x) = 0 in the interval $0 \le x \le 2\pi$ is-
(A) $\{\pi/3\}$ (B) $\{\pi/3, 5\pi/3\}$
(C) $\{\pi/3, 5\pi/3, \cos^{-1}(-3/2)\}$ (D) None of these

**5.** The most general value of $\theta$ which satisfies both the equations $\tan\theta = \sqrt{3}$ and $\text{cosec}\,\theta = -\frac{2}{\sqrt{3}}$ is

(A) $n\pi + \frac{4\pi}{3}$ ; $n \in I$ (B) $n\pi + \frac{2\pi}{3}$ ; $n \in I$

(C) $2n\pi + \frac{4\pi}{3}$ : $n \in I$ (D) $2n\pi + \frac{2\pi}{3}$ ; $n \in I$

**6.** The general value of $\theta$ satisfying the equation $\sin^2\theta - 2\cos\theta + \frac{1}{4} = 0$

(A) $2n\pi \pm \frac{\pi}{3}$ (B) $2n\pi \pm \frac{\pi}{4}$ (C) $2n\pi \pm \frac{\pi}{6}$ (D) None of these

**7.** If $1 + \cot\theta = \text{cosec}\,\theta$, then the general value of $\theta$ is

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

**8.** If $\cot\theta + \tan\theta = 2\,\text{cosec}\,\theta$, then the general value of $\theta$ is

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

**Integer Type**

**9.** If general solution of the equation $\tan^2\theta + 2\sqrt{3}\tan\theta = 1$ is in the form of $(kn+1)\frac{\pi}{12}$ (when n is any integer) then find the lowest value of k

**10.** The number of solution of the equation
$4\sin\theta\cos\theta - 2\cos\theta - 2\sqrt{3}\sin\theta + \sqrt{3} = 0$ in the interval $(0, 2\pi)$ is-

# TRIGONOMETRIC EQUATION
# DPP - 2

**1.** The number of distinct real roots of the equation $\sqrt{\sin x} - \frac{1}{\sqrt{\sin x}} = \cos x$ (where $0 \le x \le 2\pi$) is

(A) 1 (B) 2 (C) 3 (D) more than 3

**2.** 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) $x = n\pi + \frac{\pi}{2}$ when n is odd integer

(C) $x = 2n\pi$ when n is odd integer (D) $x = n\pi - \frac{\pi}{2}$ when n is even integer

**3.** If $\cos 2\theta = \left(\sqrt{2}+1\right)\left(\cos\theta - \frac{1}{\sqrt{2}}\right)$, then the value of $\theta$ is

(A) $2n\pi + \frac{\pi}{4}$ (B) $2n\pi \pm \frac{\pi}{4}$ (C) $2n\pi - \frac{\pi}{4}$ (D) None of these

**4.** If $2\sin^2 x + \sin^2 2x = 2$, $-\pi < x < \pi$, then x =

(A) $\pm\frac{\pi}{6}$ (B) $\pm\frac{\pi}{4}$ (C) $\frac{3\pi}{2}$ (D) None of these

**5.** If $3 - 2\cos\theta - 4\sin\theta - \cos 2\theta + \sin 2\theta = 0$, then $\theta$ is

(A) $(4n+1)\frac{\pi}{3}, n \in z$ (B) $(4n+1)\frac{\pi}{3} \cup n \in z$

(C) $(4n+1)\frac{\pi}{2} \cup 2n\pi, n \in z$ (D) none

**6.** The number of solutions of the equation $\sqrt{13 - 18\tan x} = 6\tan x - 3$, where $-2\pi < x < 2\pi$ is

(A) 0 (B) 2 (C) 4 (D) 8

**7.** The general solution of $\cos x + \sqrt{3}\sin x = \sqrt{3}$ is

(A) $2n\pi + \frac{\pi}{3}$ (B) $\left\{2n\pi + \frac{\pi}{2}\right\} \cup \left\{2n\pi + \frac{\pi}{6}\right\}$

(C) $\left\{2n\pi + \frac{\pi}{2}\right\} \cup \left\{2n\pi + \frac{\pi}{3}\right\}$ (D) none

**8.** The general Solution of $1 + \sqrt{3}\ \tan^2 x = \left(1+\sqrt{3}\right)\tan x$ is

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

(C) $\left\{n\pi+\frac{\pi}{4}\right\}\cup\left\{n\pi+\frac{\pi}{6}\right\}$ (D) $\left\{2n\pi+\frac{\pi}{4}\right\}\cup\left\{n\pi+\frac{\pi}{3}\right\}$

**Ineter Type**

**9.** Find the number of solutions of the equation $4 \sin x \cos^2 x - 2 \sin^2 x = 3 \sin x$ lying in the interval $[0, 2\pi]$ is

**10.** Number of roots of the equation $2 \sin^3 x + 6 \sin^2 x - \sin x - 3 = 0$ in $(0, 2\pi)$, are

# TRIGONOMETRIC EQUATION
# DPP - 3

**1.** If $x + y + z = \pi$, $\tan x \tan y = 2$, $\tan x + \tan y + \tan z = 6$ then the value of z is-

(A) $n\pi + \frac{\pi}{4}$ (B) $\tan\pi + \tan^{-1}2$ (C) $n\pi + \tan^{-1}3$ (D) None of these

**2.** General solution of the equation $4\sin^2\theta + \sqrt{3} = 2(1+\sqrt{3})\sin\theta$ is -

(A) $n\pi + (-1)^n \frac{\pi}{6}, n\pi + (-1)^n \frac{\pi}{3}$ (B) $n\pi + \frac{\pi}{6}, n\pi - \frac{\pi}{3}$

(C) $(3n \pm 1)\frac{\pi}{3}, (6n \pm 1)\frac{\pi}{6}$ (D) None of these

**3.** Solve : $\cot\theta + \tan\theta = 2\,\text{cosec}\,\theta$

(A) $\theta = 2n\pi \pm \frac{\pi}{3}; n \in I$ (B) $\theta = n\pi \pm \frac{\pi}{3}; n \in I$

(C) $\theta = 2n\pi \pm \frac{\pi}{2}; n \in I$ (D) $\theta = 2n\pi \pm \pi; n \in I$

**4.** If $\cos7\theta = \cos\theta - \sin4\theta$, then the general value of $\theta$ 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) $\frac{n\pi}{6}, \frac{n\pi}{3} + (-1)^n \frac{\pi}{18}$

**5.** The general solution of the equation $(\sqrt{3}-1)\sin\theta + (\sqrt{3}+1)\cos\theta = 2$ is

(A) $2n\pi \pm \frac{\pi}{4} + \frac{\pi}{12}$ (B) $n\pi + (-1)^n \frac{\pi}{4} + \frac{\pi}{12}$

(C) $2n\pi \pm \frac{\pi}{4} - \frac{\pi}{12}$ (D) $n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{12}$

**6.** If $\cos\theta + \cos 7\theta + \cos 3\theta + \cos 5\theta = 0$, then $\theta$ =

(A) $\frac{n\pi}{4}$; $n \in I$ (B) $\frac{n\pi}{2}$; $n \in I$ (C) $\frac{n\pi}{8}$; $n \in I$ ; $n \neq 8k$ (D) $\frac{n\pi}{3}$; $n \in I$

**7.** If $\tan\theta + \tan2\theta + \tan\theta\tan2\theta = 1$ then general value of $\theta$ is –

(A) $n\pi$; $n \in I$ (B) $n\pi \pm \frac{\pi}{3}$; $n \in I$

(C) $\frac{n\pi}{3} + \frac{\pi}{12}$; $n \in I$ (D) none of these

**8.** The general solution of tan 3x – tan 2x – tan x = 0 is

(A) $\frac{2n\pi}{3};n\in z$ (B) $\frac{n\pi}{3};n\in z$ (C) $\frac{n\pi}{4};n\in z$ (D) $\frac{n\pi}{6};n\in z$

**Multiple Type**

**9.** The general solution of $\cos^2 2x + \cos^2 x = 1$ is/ are

(A) $(2n-1)\frac{\pi}{6}$ (B) $(2n-1)\frac{\pi}{3}$ (C) $(2n-1)\frac{\pi}{4}$ (D) $(2n-1)\frac{\pi}{2}$

**Integer Type**

**10.** If the general solution of equation tan x + tan 4x + tan 7x = tan x tan 4x tan 7x is $\frac{kn\pi}{24}$ (n is any natural number, K is any constant) then find value of K.

# TRIGONOMETRIC EQUATION
# DPP - 4

**1.** Number of solutions of the equation $\tan x + \sec x = 2\cos x$ in $(-\pi, 2\pi)$, is
(A) 1 (B) 2 (C) 3 (D) 4

**2.** Number of solutions of the equation $\cos 6x + \tan^2 x + \cos 6x \cdot \tan^2 x = 1$ in the interval $[0, 2\pi]$ is -
(A) 4 (B) 5 (C) 6 (D) 7

**3.** The general solution of $\sin x - 3\sin 2x + \sin 3x = \cos x - 3\cos 2x + \cos 3x$ is

(A) $n\pi + \frac{\pi}{8}$ (B) $\frac{n\pi}{2} + \frac{\pi}{8}$ (C) $(-1)^n \frac{n\pi}{2} + \frac{\pi}{8}$ (D) $2n\pi + \cos^{-1}\frac{3}{2}$

**4.** If $\cos\theta + \cos 7\theta + \cos 3\theta + \cos 5\theta = 0$, then $\theta$ is

(A) $\frac{n\pi}{4}$ (B) $\frac{n\pi}{2}$ (C) $\frac{n\pi}{8}$ (D) None of these

**5.** Total number of solutions of $\sin x \cdot \tan 4x = \cos x$ belonging to $(0, \pi)$ are
(A) 4 (B) 7 (C) 8 (D) 5

**6.** $\sin 3\theta = 4\sin\theta \sin 2\theta \sin 4\theta$ in $0 \le \theta \le \pi$ has
(A) 2 real solutions (B) 4 real solutions
(C) 6 real solutions (D) 8 real solutions.

**7.** The number of roots of the equation, $\sin x + 2\sin 2x = 3 + \sin 3x$ is
(A) 0 (B) 1 (C) 2 (D) infinite

**8.** Number of solutions of $5\cos^2\theta - 3\sin^2\theta + 6\sin\theta\cos\theta = 7$ in the interval $[0, 2\pi]$ is.....
(A) 0 (B) 1 (C) 2 (D) 3

**Multiple Type**

**9.** Number of solution of the equation $\sin\frac{5x}{2} - \sin\frac{x}{2} = 2$ in the interval $[0, 2\pi]$, is n then n is less than
(A) 0 (B) 1 (C) 2 (D) 3

**10.** Which of the following sets can be the subset of the general solution of the equation $1 + \cos 3x = 2\cos 2x$ ?

(A) $n\pi + \frac{\pi}{3}, n \in I$ (B) $n\pi + \frac{\pi}{6}, n \in I$ (C) $n\pi - \frac{\pi}{6}, n \in I$ (D) $2n\pi, n \in I$

# TRIGONOMETRIC EQUATION
# DPP - 5

**1.** The set of values of $x$ for which $\sin x \cdot \cos^3 x > \cos x \cdot \sin^3 x$ in $[0, 2\pi]$, is

(A) $(0, \pi)$ (B) $\left(0, \frac{\pi}{4}\right)$ (C) $\left(\frac{\pi}{4}, \pi\right)$ (D) none of these

**2.** The value of x satisfying the equation $\sqrt{1+\sin x} - \sqrt{1-\sin x} = 2\sin\frac{x}{2}$ are where $n \in I$

(A) $2n\pi < x < 2(n + 1)\pi$ (B) $2n\pi - \pi/2 < x < 2n\pi + \pi/2$
(C) $n\pi - \pi/4 < x < n\pi + \pi/4$ (D) $(2n-1)\pi/2 < x < (2n+1)\pi$

**3.** The smallest positive root of the equation $\sqrt{\sin(1-x)} = \sqrt{\cos x}$ is

(A) $\frac{3\pi}{4}+\frac{1}{2}$ (B*) $\frac{7\pi}{4}+\frac{1}{2}$ (C) $\frac{11\pi}{4}+\frac{1}{2}$ (D) $\frac{\pi}{4}+\frac{1}{2}$

**4.** General solution of the equation $\sec x = 1 + \cos x + \cos^2 x + \cos^3 x + \ldots\ldots\ldots \infty$, is

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

where $n$ is an integer.

**5.** The true solution set of the inequality $\sin x + \sin 2x \geq 0$ in $(0, 2\pi)$ is

(A) $\left(0, \frac{2\pi}{3}\right] \cup \left[\pi, \frac{4\pi}{3}\right]$ (B) $\left(0, \frac{\pi}{3}\right] \cup \left[\frac{4\pi}{3}, 2\pi\right)$

(C) $\left[\frac{2\pi}{3}, \frac{4\pi}{3}\right] \cup \left[\frac{5\pi}{3}, 2\pi\right)$ (D) $[0, \pi] \cup \left[\frac{5\pi}{3}, 2\pi\right)$

**6.** General solution of the equation $|\cos x| = \sin x$, is

(A) $n\pi + (-1)^n \frac{\pi}{4}$ (B) $2n\pi \pm \frac{\pi}{4}$ (C) $n\pi + \frac{\pi}{4}$ (D) $2n\pi + \frac{\pi}{4}$

where $n \in I$

**7.** Number of solutions of the equation $2\tan^2 x - 5\sec x = 1$ in $(-\pi, 2\pi)$ is equal to
(A) 2 (B) 3 (C) 4 (D) 5

**8.** General solution of the trigonometric equation, $\left(2\sin^4\frac{x}{2} - 1\right)\frac{1}{\cos^4\frac{x}{2}} = 2$, is

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

where $n \in I$

**Integer Type**

**9.** The number of solutions of the equation, $\sin 2x + \cos 2x + \sin x + \cos x + 1 = 0$ where $x \in [0, 2\pi]$, is

**10.** The number of solutions of the equation, $\sin^5 x - \cos^5 x = \frac{1}{\cos x} - \frac{1}{\sin x}$, $(\sin x \neq \cos x)$ is

# TRIGONOMETRIC EQUATION
# DPP - 6

**1.** Number of principal solution(s) of the equation, $4 \cdot 16^{\sin^2 x} = 2^{6 \sin x}$, is

(A) 1 (B) 2 (C) 3 (D) 4

**2.** Number of solution of the equation $2\sqrt{\cos^6\theta - \sin^6\theta}$ = 1 + cos 2$\theta$ in $[-\pi, \pi]$ is

(A) 1 (B) 2 (C) 3 (D) 4

**3.** The true set of values of $x \in \left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$ satisfying $\left|4\sin x - 1\right| < \sqrt{5}$ is equal to

(A) $\left(\frac{\pi}{10}, \frac{3\pi}{10}\right)$ (B) $\left(\frac{-\pi}{10}, \frac{3\pi}{10}\right)$ (C) $\left(\frac{-\pi}{5}, \frac{\pi}{5}\right)$ (D) $\left(\frac{-2\pi}{3}, \frac{\pi}{3}\right)$

**4.** If $2^{\left(\sqrt{\sin^2 x - 2\sin x + 5} - 2\sin^2 y\right)} \le 1$ then number of ordered pairs (x, y) in $[0, 2\pi]$

(A) 0 (B) 1 (C) 2 (D) 3

**5.** Let $\theta \in [0, 4\pi]$ satisfying the equation (sin $\theta$ + 2) (sin $\theta$ + 3) (sin $\theta$ + 4) = 6. If the sum of all value of $\theta$ is of the form k$\pi$ then the value of 'k', is

(A) 6 (B) 5 (C) 4 (D) 2

**6.** Number of solutions of the equation sin x + $\sin^2$x + $\sin^3$x + $\sin^4$x + .....$\infty$ = 2 where $x \in [0, 4\pi]$, is

(A) 2 (B) 4 (C) 5 (D) 6

**7.** In the interval $\left[0, \frac{\pi}{2}\right]$, the equation $\cos^2 x - \cos x - x = 0$ has

(A) no solution
(B) exactly one solution
(C) exactly two solutions
(D) more than two solutions

**8.** Number of values of $\theta$ lying in (–6, 3) and satisfying $\cot\frac{\theta}{2}$ = 1 + cot $\theta$, is

(A) 2 (B) 3 (C) 8 (D) 13

**Integer Type**

**9.** The number of solution of $2\cos^2\left(\frac{x}{2}\right)\sin^2 x = x^2 + \frac{1}{x^2}$, $0 \le x \le \pi/2$ is .....

**Multiple Type**

**10.** The values of x satisfying the system of equations $2^{\sin x + \cos y} = 1, 16^{\sin^2 x + \cos^2 y} = 4$ are given by

(A) $x = n\pi + (-1)^n \frac{\pi}{6}$ and $y = 2n\pi \pm \frac{\pi}{3}$ (B) $x = n\pi + (-1)^{n+1} \frac{\pi}{6}$ and $y = 2n\pi \pm \frac{\pi}{3}$

(C) $x = n\pi + (-1)^n \frac{\pi}{6}$ and $y = 2n\pi \pm \frac{2\pi}{3}$ (D) $x = n\pi + (-1)^{n+1} \frac{\pi}{6}$ and $y = 2n\pi \pm \frac{2\pi}{3}$