

Date Planned : __ / __ / __	Daily Tutorial Sheet – 5	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level – 1	Exact Duration: _____

61. The value of $\sum_{r=1}^{18} \cos^2(5r)^\circ$ is where x° denotes the degrees:
- (A) 0 (B) $\frac{7}{2}$ (C) $\frac{17}{2}$ (D) $\frac{25}{2}$
62. If $a \sin x + b \cos(x + \theta) + b \cos(x - \theta) = d$ for some real x , (where $d^2 \geq a^2$ and $a, b, d \neq 0$) then the minimum value of $|\cos \theta|$ is equal to:
- (A) $\frac{1}{2|b|} \sqrt{d^2 - a^2}$ (B) $\frac{1}{2|a|} \sqrt{d^2 - a^2}$ (C) $\frac{1}{2|d|} \sqrt{d^2 - a^2}$ (D) $\frac{1}{|a|} \sqrt{d^2 - a^2}$ 
63. If $\frac{\sqrt{1 + \cos x} + \sqrt{1 - \cos x}}{\sqrt{1 + \cos x} - \sqrt{1 - \cos x}} = \cot\left(a + \frac{x}{2}\right)$ and $x \in (\pi, 2\pi)$, then 'a' is equal to: 
- (A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$ (C) $\frac{\pi}{3}$ (D) None of these
64. If $\frac{\cos x}{a} = \frac{\sin x}{b}$, then $|a \cos 2x + b \sin 2x|$ is equal to:
- (A) $\sqrt{a^3 b}$ (B) $\frac{a^2}{|b|}$ (C) $\frac{b^2}{|a|}$ (D) $|a|$
65. If $\cot^2 x = \cot(x - y) \cdot \cot(x - z)$, where $x \neq \pm \frac{\pi}{4}$, then $\cot 2x$ is equal to: 
- (A) $\frac{1}{2}(\tan y + \tan z)$ (B) $\frac{1}{2}(\cot y + \cot z)$
- (C) $\frac{1}{2}(\sin y + \sin z)$ (D) None of these
66. If x_1 and x_2 are two distinct roots of the equation $a \cos x + b \sin x = c$, then $\tan \frac{x_1 + x_2}{2}$ is equal to:
- (A) $\frac{a}{b}$ (B) $\frac{b}{a}$ (C) $\frac{c}{a}$ (D) $\frac{a}{c}$
67. The given expression $\sec^2 \theta = \frac{4xy}{(x + y)^2}$ is true if and only if:
- (A) $x + y \neq 0$ (B) $x = y, x \neq 0$ (C) $x = y$ (D) $x \neq 0, y \neq 0$
68. If $\cos \alpha + \cos \beta = a$, $\sin \alpha + \sin \beta = b$ and θ is the arithmetic mean between α and β , then $(\sin 2\theta + \cos 2\theta)$ is equal to:
- (A) $\frac{(a + b)^2}{a^2 + b^2}$ (B) $\frac{(a - b)^2}{a^2 + b^2}$ (C) $\frac{a^2 - b^2}{a^2 + b^2}$ (D) None of these

69. If $4\cos^4\theta + \alpha$, $4\sin^4\theta + \alpha$ are the roots of the equation $x^2 + b(2x+1) = 0$ and $4\cos^2\theta + \beta$, $4\sin^2\theta + \beta$ are the roots of the equation $x^2 + 4x + 2 = 0$ then b is equal to:



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

For Questions 70-73

- (A) Statement-1 is True, Statement-2 is True and Statement-2 is a correct explanation for Statement-1.
- (B) Statement-1 is True, Statement-2 is True and Statement-2 is NOT a correct explanation for Statement-1.
- (C) Statement-1 is True, Statement-2 is False.
- (D) Statement-1 is False, Statement-2 is True.
70. Statement-1: If $\sec\theta + \tan\theta = m \neq 0$, then $\sin\theta = \frac{m^2 - 1}{m^2 + 1}$.
Statement-2: For any θ , for which $\cos\theta \neq 0$, $\sec^2\theta - \tan^2\theta = 1$.
71. Statement-1: If $x \in \mathbb{R}$, $x \neq 0$, then $x^2 + \frac{1}{x^2}$ cannot be equal to $\cos\theta$ for any θ .
Statement-2: Sum of a positive number and its reciprocal cannot be less than 2.
72. Statement-1: $\sin 3 < \sin 1 < \sin 2$.
Statement-2: $\sin x$ is positive in the first and second quadrants.
73. Statement-1: If $a, b, c, \theta \in \mathbb{R}$, then the equation $a\sin\theta + b\cos\theta = c$ has a solution only if $c^2 > a^2 + b^2$.
Statement-2: If $a, b, c, \theta \in \mathbb{R}$, then the minimum and maximum values of $a\sin\theta + b\cos\theta$ are respectively $-\sqrt{a^2 + b^2}$ and $\sqrt{a^2 + b^2}$.
- *74. If $\sec\theta + \tan\theta = 1$, then root of the equation $(a - 2b + c)x^2 + (b - 2c + a)x + (c - 2a + b) = 0$ is:
- (A) $\sec\theta$ (B) $\tan\theta$ (C) $\sin\theta$ (D) $\cos\theta$
75. If $\tan x + \cot x = 2$, then $\sin^{2n}x + \cos^{2n}x$ is equal to : ($n \in \mathbb{N}$)
- (A) 2^n (B) $-\frac{1}{2}$ (C) $\frac{1}{2}$ (D) None of these