

Tarun Classes of Mathematics

IIT-JEE Mains | CBSE | PU-CET | NDA

Talwara Township, Hoshiarpur | +91 9463672753 | tarunclasses.in

Trigonometry Functions

Subjects : Maths

Previous Year Questions

Maths - Section A (MCQ.)

- If $\cos \theta = \frac{1}{3}$, then what is the value of $\sin \left(\frac{\theta}{2} \right) \sin \left(\frac{3\theta}{2} \right)$?
A) $\frac{5}{9}$ B) $\frac{7}{9}$ C) $\frac{10}{9}$ D) $\frac{11}{9}$
- $\cos x + \sqrt{3} \sin x$ is maximum when x is equal to
A) $\frac{\pi}{2}$ B) $\frac{\pi}{3}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{6}$
- If α and β are complementary angles such that $\alpha - \beta = \frac{\pi}{6}$ and $m \tan \beta = n \tan \alpha$, then what is $\left(\frac{m+n}{m-n} \right)$ equal to ?
A) 2 B) $\frac{2}{\sqrt{3}}$ C) 1 D) $\frac{1}{\sqrt{3}}$
- If θ lies in the fourth quadrant and $3 \cot \theta + 4 = 0$, then what is the value of $\sin 2\theta + \cos 2\theta$?
A) $-\frac{31}{25}$ B) $-\frac{17}{25}$ C) 0 D) 1
- If $2 \sec 4\beta = \tan 2\alpha + \cot 2\alpha$, then which one of the following is a possible value of $(\alpha + \beta)$?
A) $\frac{\pi}{2}$ B) $\frac{\pi}{4}$ C) $\frac{\pi}{6}$ D) $\frac{\pi}{8}$
- If $\cos \alpha + \cos \beta = 0 = \sin \alpha + \sin \beta$, $\alpha \neq \beta$ then what is a value of $\cos 2\alpha + \cos 2\beta + 2 \cos(\alpha + \beta)$?
A) 0 B) 1 C) 2 D) 4
- In a triangle ABC , $\sin A = \cos B + \cos C$ then what is $\tan \left(\frac{B}{2} \right) + \cot \left(\frac{B}{2} \right)$ equal to ?
A) 1 B) $\sqrt{2}$ C) $\sqrt{3}$ D) 2
- If A and B are acute angles such that $2A + 2B = \pi$, then what is the maximum value of $\sin A \cdot \sin B$?
A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{\sqrt{3}}{4}$ D) 1
- In a triangle ABC , $\tan A + \tan B + \tan C = k$ What is the value of $\cot A \cot B \cot C$?
A) $0.5k$ B) $\frac{1}{k}$ C) $\frac{3}{k}$ D) $\frac{1}{k^3}$
- What is $\frac{\sqrt{3} \cos 10^\circ - \sin 10^\circ}{\sin 25^\circ \cos 25^\circ}$ equal to?
A) 1 B) $\sqrt{3}$ C) 2 D) 4
- ABC is a triangle such that angle $C = 60^\circ$, then what is $\frac{\cos A + \cos B}{\cos \left(\frac{A+B}{2} \right)}$ equal to?
A) 2 B) $\sqrt{2}$ C) 1 D) $\frac{1}{\sqrt{2}}$

12. What is $\sin 12^\circ \sin 48^\circ$ equal to?

- A) $\frac{\sqrt{5}-1}{4}$ B) $\frac{\sqrt{5}+1}{4}$ C) $\frac{\sqrt{5}-1}{8}$ D) $\frac{\sqrt{5}+1}{8}$

13. What is $\frac{\cos 17^\circ - \sin 17^\circ}{\cos 17^\circ + \sin 17^\circ}$ equal to?

- A) $\tan 34^\circ$ B) $\cot 34^\circ$
C) $\tan 62^\circ$ D) $\cot 62^\circ$

14. If $\frac{x}{\cos \theta} = \frac{y}{\cos(\frac{2\pi}{3} - \theta)} = \frac{z}{\cos(\frac{2\pi}{3} + \theta)}$ then what is $x + y + z$ equal to?

- A) -1 B) 0 C) 1 D) 3

15. If $p \tan(\theta - 30^\circ) = q \tan(\theta + 120^\circ)$, then what is $\frac{(p+q)}{(p-q)}$ equal to?

- A) $\sin 2\theta$ B) $\cos 2\theta$ C) $2 \sin 2\theta$ D) $2 \cos 2\theta$

16. What is the maximum value of the $a \cos x + b \sin x + c$?

- A) $\sqrt{a^2 + b^2} + c$ B) $\sqrt{a^2 + b^2} - c$ C) $\sqrt{a^2 + b^2} - c$ D) $\sqrt{a^2 + b^2}$

17. If ABC is a triangle, then what is the value of the determinant $\begin{vmatrix} \cos C & \sin B & 0 \\ \tan A & 0 & \sin B \\ 0 & \tan(B+C) & \cos C \end{vmatrix}$?

- A) -1 B) 0 C) 1 D) 3

18. What is $(\sin 9^\circ - \cos 9^\circ)$ equal to?

- A) $-\frac{\sqrt{5}-\sqrt{5}}{2}$ B) $-\frac{\sqrt{5}-\sqrt{3}}{2}$ C) $\frac{\sqrt{5}-\sqrt{5}}{2}$ D) $\frac{\sqrt{5}-\sqrt{5}}{4}$

19. If $f(\theta) = \frac{1}{1+\tan \theta}$ and $\alpha + \beta = \frac{5\pi}{4}$, then what is the value of $f(\alpha)f(\beta)$?

- A) $-\frac{1}{2}$ B) $\frac{1}{2}$ C) 1 D) 2

20. Paragraph:

Given that

$$\sin x + \cos x + \tan x + \cot x + \sec x + \operatorname{cosec} x = 7$$

Question:

If $\sin 2x = a - b\sqrt{c}$, where a and b are natural numbers and c is prime number, then what is the value of $a - b + 2c$?

- A) 0 B) 14 C) 21 D) 28

21. If $f(x) = x(4x^2 - 3)$, then what is $f(\sin \theta)$ equal to?

- A) $-\sin 3\theta$ B) $-\cos 3\theta$ C) $\sin 3\theta$ D) $-\sin 4\theta$

22. If $\tan \alpha = \frac{1}{7}$, $\sin \beta = \frac{1}{\sqrt{10}}$; $0 < \alpha, \beta < \frac{\pi}{2}$ then what is the value of $\cos(\alpha + 2\beta)$?

- A) $-\frac{1}{2}$ B) $-\frac{1}{\sqrt{2}}$ C) $\frac{1}{\sqrt{2}}$ D) $\frac{1}{2}$

23. Let $p = \cos\left(\frac{\pi}{5}\right)\cos\left(\frac{2\pi}{5}\right)$ and $q = \cos\left(\frac{4\pi}{5}\right)\cos\left(\frac{8\pi}{5}\right)$. What is the value of $p + q$?

- A) $-\frac{1}{2}$ B) $-\frac{1}{4}$ C) 0 D) $\frac{1}{2}$

24. Let $p = \cos\left(\frac{\pi}{5}\right)\cos\left(\frac{2\pi}{5}\right)$ and $q = \cos\left(\frac{4\pi}{5}\right)\cos\left(\frac{8\pi}{5}\right)$. What is the value of pq ?

- A) $-\frac{1}{16}$ B) $-\frac{1}{4}$ C) $\frac{1}{4}$ D) $\frac{1}{16}$

25. If $\alpha + \beta = \frac{\pi}{4}$ and $2 \tan \alpha = 1$, then what is $\tan 2\beta$ equal to?

A) $\frac{1}{3}$

B) $\frac{2}{3}$

C) $\frac{3}{4}$

D) $\frac{3}{5}$

26. A function is defined by $f(x) = \pi + \sin^2 x$
What is the period of the function?

A) 2π

B) π

C) $\frac{\pi}{2}$

D) The function is non-periodic

27. Let $\sin 2\theta = \cos 3\theta$, where θ is acute angle. What is the value of $1 + 4 \sin \theta$?
(given that $\sin 18^\circ = \frac{\sqrt{5}-1}{4}$)

A) $\sqrt{3}$

B) 2

C) $\sqrt{5}$

D) 3

28. What is the value of $\cos^4 \frac{7\pi}{8} + \cos^4 \frac{5\pi}{8}$?

A) $\frac{3}{2}$

B) $\frac{3}{4}$

C) $\frac{3}{8}$

D) $\frac{3}{16}$

29. What is the value of $\cos\left(\frac{5\pi}{17}\right) + \cos\left(\frac{7\pi}{17}\right) + 2\cos\left(\frac{11\pi}{17}\right)\cos\left(\frac{\pi}{17}\right)$?

A) 0

B) 1

C) $4\cos\left(\frac{6\pi}{17}\right)\cos\left(\frac{\pi}{17}\right)$

D) $4\cos\left(\frac{11\pi}{17}\right)\cos\left(\frac{\pi}{17}\right)$

30. If $(1 + \tan \theta)(1 + \tan 9\theta) = 2$, then what is the value of $\tan(10\theta)$?

A) 0

B) 1

C) 2

D) Infinite

31. What is the value of $\sin\left(2n\pi + \frac{5\pi}{6}\right)\sin\left(2n\pi - \frac{5\pi}{6}\right)$,
where $n \in \mathbb{Z}$?

A) $\frac{1}{4}$

B) $-\frac{3}{4}$

C) $-\frac{1}{4}$

D) $\frac{3}{4}$

32. If $\sin(A + B) = 1$ and $2\sin(A - B) = 1$, where $0 < A, B < \frac{\pi}{2}$, then what is $\tan A : \tan B$ equal to?

A) 1 : 2

B) 2 : 1

C) 1 : 3

D) 3 : 1

33. Let $\sin x + \sin y = \cos x + \cos y$ for all $x, y \in \mathbb{R}$. What is $\tan\left(\frac{x}{2} + \frac{y}{2}\right)$ equal to?

A) 1

B) 2

C) $\sqrt{2}$

D) $2\sqrt{2}$

34. What is $\cot 2x \cot 4x - \cot 4x \cot 6x - \cot 6x \cot 2x$ equal to?

A) -1

B) 0

C) 1

D) 2

35. 16. If $\tan x = -\frac{3}{4}$ and x is in the second quadrant, then what is the value of $\sin x \cdot \cos x$?

A) $\frac{6}{25}$

B) $\frac{12}{25}$

C) $-\frac{6}{25}$

D) $-\frac{12}{25}$

36. What is the value of the following?

$$(\sin 24^\circ + \cos 66^\circ)(\sin 24^\circ - \cos 66^\circ)$$

A) -1

B) 0

C) 1

D) 2

37. If $7 \sin \theta + 24 \cos \theta = 25$, then what is the value of $(\sin \theta + \cos \theta)$?

A) 1

B) $\frac{26}{25}$

C) $\frac{6}{5}$

D) $\frac{31}{25}$

38. A and B are positive acute angles such that $\cos 2B = 3 \sin^2 A$ and $3 \sin 2A = 2 \sin 2B$. What is the value of $(A + 2B)$?

A) $\frac{\pi}{6}$

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

C) $\frac{\pi}{3}$

D) $\frac{\pi}{2}$

39. What is

$$\sin 3x + \cos 3x + 4 \sin^3 x - 3 \sin x + 3 \cos x - 4 \cos^3 x$$

equal to ?

A) 0

B) 1

C) $2 \sin 2x$

D) $4 \cos 4x$

40. What is the value of $8 \cos 10^\circ \cdot \cos 20^\circ \cdot \cos 40^\circ$?

- A)** $\tan 10^\circ$ **B)** $\cot 10^\circ$
C) $\operatorname{cosec} 10^\circ$ **D)** $\sec 10^\circ$

41. Paragraph:

Read the following information and answer

Let $t_n = \sin^n \theta + \cos^n \theta$.

Question:

What is $t_1^2 - t_2$ equal to?

- A)** $\cos 2\theta$ **B)** $\sin 2\theta$ **C)** $2 \cos \theta$ **D)** $2 \sin \theta$

42. What is the minimum value of $3 \cos \left(A + \frac{\pi}{3} \right)$ where $A \in R$?

- A) -3 B) -1 C) 0 D) 3

43. The value of $\sqrt{3} \operatorname{cosec} 20^\circ - \sec 20^\circ$ is equal to

- A) 4**

44. If $\tan(\alpha + \beta) = 2$ and $\tan(\alpha - \beta) = 1$, then $\tan(2\alpha)$ is equal to

- A) -3 B) -2 C) $-\frac{1}{3}$ D) 1

45. If $A = \sin^2 \theta + \cos^4 \theta$, then for all real θ , which one of the following is correct?

- A)** $1 \leq A \leq 2$ **B)** $\frac{3}{4} \leq A \leq 1$ **C)** $\frac{13}{16} \leq A \leq 1$ **D)** $\frac{3}{4} \leq A \leq \frac{13}{16}$

46. The value of $\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ$ is equal to

- A) -1 B) 0 C) 1 D) 4

47. Paragraph:

Consider the function $f(x) = g(x) + h(x)$ where $g(x) = \sin\left(\frac{x}{4}\right)$ and $h(x) = \cos\left(\frac{4x}{5}\right)$

Question:

What is the period of the function $g(x)$?

- A)** π **B)** 2π **C)** 4π **D)** 8π

48. If $\sin \theta + \cos \theta = \sqrt{2} \cos \theta$, then what is $(\cos \theta - \sin \theta)$ equal to?

- A) $-\sqrt{2} \cos \theta$ B) $-\sqrt{2} \sin \theta$ C) $\sqrt{2} \sin \theta$ D) $2 \sin \theta$

49. If $2 \tan A - 3 \tan B = 1$, then what is $\tan(A - B)$ equal to?

- A) $\frac{1}{5}$ B) $\frac{1}{6}$ C) $\frac{1}{7}$ D) $\frac{1}{9}$

50. What is the number of solutions of $(\sin \theta - \cos \theta)^2 = 2$ where $-\pi < \theta < \pi$?

- A)** Only one **B)** Only two **C)** Four **D)** No solution

51. What is the number of solutions of the equation $\cot 2x \cdot \cot 3x = 1$ for $0 < x < \pi$?

- A) Only one** **B) Only two** **C) Only five** **D) More than five**

52. What is the general solution of $\cos^{100} x - \sin^{100} x = 1$?
where n is an integer.

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

53. If $\tan(\pi \cos \theta) = \cot(\pi \sin \theta)$, $0 < \theta < \frac{\pi}{2}$; then what is the value of $8 \sin^2(\theta + \frac{\pi}{4})$

- A) 16 B) 2 C) 1 D) $\frac{1}{2}$

54. The value of x , satisfying the equation $\log_{\cos x} \sin x = 1$, where $0 < x < \frac{\pi}{2}$, is

A) $\frac{\pi}{12}$

B) $\frac{\pi}{3}$

C) $\frac{\pi}{4}$

D) $\frac{\pi}{6}$

55. The angles A , B and C of a triangle are in the ratio $1 : 1 : 4$. If the longest side of the triangle is 3 units, then what is the perimeter of the triangle ?

A) $3 + \sqrt{3}$ units B) $3 + 2\sqrt{3}$ units C) $3 + 3\sqrt{3}$ units D) $6 + \sqrt{3}$ units

56. In a triangle ABC , if a , b and c are the lengths of the sides opposite to the angles A , B and C respectively, then what is $\frac{\sin(A - B)}{\sin(A + B)}$ equal to ?

A) $\frac{a^2}{a^2 - b^2}$

B) $\frac{a^2}{a^2 + b^2}$

C) $\frac{a^2 - b^2}{c^2}$

D) $\frac{a^2 - b^2}{b^2}$

57. If a, b, c are the sides of triangle ABC , then what is $\begin{vmatrix} a^2 & b \sin A & c \sin A \\ b \sin A & 1 & \cos A \\ c \sin A & \cos A & 1 \end{vmatrix}$ equal to?

A) Zero B) Area of triangle C) Perimeter of triangle D) $a^2 + b^2 + c^2$

58. In a triangle ABC , $\frac{a}{\cos A} = \frac{b}{\cos B} = \frac{c}{\cos C}$. What is the area of the triangle if $a = 6$ cm ?

A) $9\sqrt{3}$ square cm B) 12 square cm C) $18\sqrt{3}$ square cm D) 24 square cm

59. In a triangle ABC , $AB = 16$ cm, $BC = 63$ cm and $AC = 65$ cm. What is the value of $\cos 2A + \cos 2B + \cos 2C$?

A) -1 B) 0 C) 1 D) $\frac{76}{65}$

60. The angles A , B and C of a triangle ABC are in the ratio $3 : 5 : 4$. What is the value of $a + b + \sqrt{2}c$ equal to?

A) $3a$ B) $2b$ C) $3b$ D) $2c$

61. A plane is observed to be approaching the airport. It is at a distance of 10 km from the point of observation and makes an angle of elevation of 67.5° . What is the height of the plane above the ground ?

A) $10\sqrt{2 + \sqrt{2}}$ km B) $10\sqrt{2 - \sqrt{2}}$ km C) $5\sqrt{2 + \sqrt{2}}$ km D) $5\sqrt{2 - \sqrt{2}}$ km

62. A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff of height h . At a point on the plane the angles of elevation of the bottom and top of the flagstaff are θ and 2θ respectively. What is the height of the tower?

A) $h \cos \theta$ B) $h \sin \theta$ C) $h \cos 2\theta$ D) $h \sin 2\theta$

63. The shadow of a tower becomes x metre longer, when the angle of elevation of sun changes from 60° to θ . If the height of the tower is $\sqrt{3}x$ metre, then which one of the following is correct?

A) $0 < \theta < 30^\circ$ B) $30^\circ < \theta < 45^\circ$

C) $45^\circ < \theta < 60^\circ$ D) $60^\circ < \theta < 90^\circ$

64. A ladder 6 m long reaches a point 6 m below the top of a vertical flagstaff. From the foot of the ladder, the elevation of the top of the flagstaff is 75° . What is the height of the flagstaff?

A) $12m$ B) $9m$ C) $(6 + \sqrt{3})m$ D) $(6 + 3\sqrt{3})m$

65. The shadow of a tower is found to be x metre longer, when the angle of elevation of the sun changes from 60° to 45° . If the height of the tower is $5(3 + \sqrt{3})m$, then what is x equal to?

A) $8m$ B) $10m$ C) $12m$ D) $15m$

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Trigonometry Functions

Subjects : Maths

Previous Year Questions

Maths - Section A (MCQ.)

1 - A	2 - B	3 - A	4 - B	5 - D	6 - A	7 - D	8 - A	9 - B	10 - D
11 - C	12 - C	13 - D	14 - B	15 - D	16 - B	17 - B	18 - C	19 - B	20 - D
21 - A	22 - C	23 - C	24 - A	25 - C	26 - B	27 - A	28 - B	29 - A	30 - B
31 - A	32 - D	33 - A	34 - C	35 - D	36 - B	37 - D	38 - D	39 - A	40 - B
41 - B	42 - A	43 - A	44 - A	45 - B	46 - D	47 - D	48 - C	49 - C	50 - B
51 - C	52 - A	53 - C	54 - C	55 - B	56 - C	57 - A	58 - A	59 - C	60 - C
61 - C	62 - C	63 - B	64 - D	65 - B					