



MULTIPLE CHOICE TYPE QUESTIONS

For 2025 Exams - Mathematics (041) - Class 11

☑ Select the correct option in the followings. Each question carries 1 mark.

01. The least value of $\sin x \cos x$ is
 (a) 1 (b) $-\frac{1}{2}$ (c) 0 (d) $\frac{1}{2}$
02. The value of $\cos 1^\circ \times \cos 2^\circ \times \cos 3^\circ \times \dots \times \cos 179^\circ$ is
 (a) $\frac{1}{\sqrt{2}}$ (b) 1 (c) 0 (d) -1
03. The value of $\frac{1 + \tan^2 15^\circ}{1 - \tan^2 15^\circ}$ is
 (a) $\frac{\sqrt{3}}{2}$ (b) $\sqrt{3}$ (c) $\frac{2}{\sqrt{3}}$ (d) 2
04. If $\sin \theta + \cos \theta = 1$, then the value of $\sin 2\theta$ is equal to
 (a) 1 (b) 1 (c) 2 (d) 0
05. If $\alpha + \beta = \frac{3\pi}{4}$, then value of $(1 - \tan \alpha)(1 - \tan \beta) =$
 (a) 1 (b) -2 (c) 2 (d) 0
06. If $\sin x = -\frac{1}{2}$, $x \in \left(\pi, \frac{3\pi}{2}\right)$, then the value of $\cos 3x$ is
 (a) 0 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$
07. If $P = 2\sin^2 x + \cos^2 x$, then P lies in the interval
 (a) [1, 3] (b) [1, 2] (c) [-1, 2] (d) None of these
08. If $0 < x < \frac{\pi}{4}$, then the value of $\sqrt{1 - \sin 2x}$ is
 (a) $\cos x - \sin x$ (b) $\cos x + \sin x$ (c) $\sin x - \cos x$ (d) $(\sin x - \cos x)^2$
09. $\sec(-1485^\circ)$ equals
 (a) $-\frac{2}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{2}}$ (c) $\sqrt{2}$ (d) -2
10. $2\sin^2 x + 2\sin^2(x + 60^\circ) + 2\sin^2(x - 60^\circ) =$

- (a) $\frac{3}{2}$ (b) $\frac{1}{2}$ (c) 3 (d) $-\frac{3}{2}$
11. If $\cos x = -\frac{1}{4}$, $x \in \left(\pi, \frac{3\pi}{2}\right)$, then $\cos \frac{x}{2} =$
 (a) $\sqrt{\frac{3}{8}}$ (b) $\frac{2\sqrt{2}}{3}$ (c) $-\frac{2\sqrt{2}}{3}$ (d) $-\sqrt{\frac{3}{8}}$
12. $\cos 2400^\circ =$
 (a) $-\frac{\sqrt{3}}{2}$ (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$
13. If $\tan 2x = \frac{2 \tan x}{m + n \tan^2 x}$, then $m + n =$
 (a) 2 (b) -1 (c) 1 (d) 0
14. Radian equivalent of 315° is
 (a) $\frac{3\pi}{4}$ (b) $\frac{7\pi}{4}$ (c) $\frac{5\pi}{4}$ (d) $\frac{9\pi}{4}$
15. $\tan\left(-\frac{314\pi}{3}\right) =$
 (a) $-\sqrt{2}$ (b) $\sqrt{2}$ (c) 2 (d) $\sqrt{3}$
16. The radius of a circle whose arc of length 15π cm makes an angle of 135° at the centre, is
 (a) 10 cm (b) $22\frac{1}{2}$ cm (c) $11\frac{1}{4}$ cm (d) 20 cm
17. $\sqrt{2} \sin^2\left(-\frac{71\pi}{4}\right) =$
 (a) $-\frac{1}{\sqrt{2}}$ (b) $\frac{1}{\sqrt{2}}$ (c) -1 (d) 1
18. Let $y = |\sin x|$, $x \in \text{Real numbers}$. Then
 (a) $-1 \leq y \leq 1$ (b) $-1 < y < 1$ (c) $0 < y < 1$ (d) $0 \leq y \leq 1$
19. Let $f(x) = \cot x$. Then $x \in$
 (a) $\mathbb{R}$ (b) $\mathbb{R} - n\pi, n \in \mathbb{Z}$
 (c) $\mathbb{R} - (2n \pm 1)\pi, n \in \mathbb{Z}$ (d) $\mathbb{R} - (2n \pm 1)\frac{\pi}{2}, n \in \mathbb{Z}$
20. Maximum value of $f(x) = 12 \sin x - 5 \cos x$ is
 (a) 7 (b) 1 (c) 17 (d) 13
21. For $f(x) = \sin x - \cos x - \sqrt{2}$, the range is

- (a) $[-2\sqrt{2}, 0]$ (b) $[-\sqrt{2}, 0]$ (c) $[0, \sqrt{2}]$ (d) $[-\sqrt{2}, 1]$
22. $\operatorname{cosec}\left(-\frac{19\pi}{6}\right) =$
- (a) $-\frac{2}{\sqrt{3}}$ (b) $\frac{2}{\sqrt{3}}$ (c) 2 (d) -2
23. If $\cos \theta + \sec \theta = 2$, then $\cos^2 \theta + \sec^2 \theta$ is equal to
- (a) 1 (b) 4 (c) 2 (d) 0
24. If $f(x) = \cos^2 x + 1$, then
- (a) $2 \leq f(x) \leq 1$ (b) $0 < f(x) < 1$ (c) $0 \leq f(x) \leq 1$ (d) $1 \leq f(x) \leq 2$
25. If $\tan \theta = \frac{1}{2}$ and $\tan \phi = \frac{1}{3}$, then $\tan(\theta + \phi) =$
- (a) 45° (b) 1 (c) 0 (d) 135°
26. Which of the following is incorrect?
- (a) $\sin \theta = -\frac{1}{5}$ (b) $\cos \theta = 1$ (c) $\sec \theta = 2$ (d) $\operatorname{cosec} \theta = -\frac{1}{2}$
27. The value of $\cot 75^\circ - \tan 75^\circ$ is
- (a) $2\sqrt{3}$ (b) $2 + \sqrt{3}$ (c) $-2\sqrt{3}$ (d) $2 - \sqrt{3}$
28. Which of the following is correct?
- (a) $\sin 1^\circ > \sin 1$ (b) $\sin 1^\circ = \frac{\pi}{18^\circ} \sin 1$ (c) $\sin 1^\circ = \sin 1$ (d) $\sin 1^\circ < \sin 1$
29. The minimum value of $2 \cos x + 3 \sin x$ is
- (a) -13 (b) 13 (c) $-\sqrt{13}$ (d) $\sqrt{13}$
30. $\frac{\sin x + \sin y}{2} =$
- (a) $\cos \frac{x+y}{2} \sin \frac{x-y}{2}$ (b) $\sin \frac{x+y}{2} \cos \frac{x-y}{2}$
- (c) $\sin \frac{x+y}{2} \sin \frac{x-y}{2}$ (d) $\cos \frac{x+y}{2} \cos \frac{x-y}{2}$
31. If $\sin \theta = \cos \theta$, then the value of $\tan \theta$ is
- (a) 1 (b) $\frac{1}{2}$ (c) 0 (d) $\frac{1}{\sqrt{2}}$
32. If $p = \sin 15^\circ + \cos 15^\circ$, then $(2p^2 + 1) =$
- (a) 3 (b) 2 (c) 1 (d) 4

33. $\frac{3 \tan 20^\circ - \tan^3 20^\circ}{1 - 3 \tan^2 20^\circ} =$
 (a) 0 (b) -1 (c) $\sqrt{3}$ (d) 1
34. Domain of $\sec x$ is $x \in$
 (a) $\mathbb{R} - n\pi, n \in \mathbb{Z}$ (b) $\mathbb{R} - (2n \pm 1)\pi, n \in \mathbb{Z}$
 (c) $\mathbb{R}$ (d) $\mathbb{R} - (2n \pm 1)\frac{\pi}{2}, n \in \mathbb{Z}$
35. Range of $\operatorname{cosec} x$ is
 (a) $\mathbb{R}$ (b) $[-1, 1]$ (c) $(-1, 1)$ (d) $(-\infty, -1] \cup [1, \infty)$
36. $1^\circ =$
 (a) $60''$ (b) $60'$ (c) $\frac{1}{60'}$ (d) $\frac{1}{60''}$
37. A wheel of a vehicle makes 360 revolutions in a time period of one minute. Through how many radians does it turn in 1.5 seconds?
 (a) 18π (b) 12π (c) 2π (d) 9π
38. Value of $\tan \frac{5\pi}{12}$ is
 (a) $\frac{\sqrt{3}-1}{\sqrt{3}+1}$ (b) $\frac{\sqrt{3}+1}{\sqrt{3}-1}$ (c) $\frac{1+\sqrt{3}}{1-\sqrt{3}}$ (d) $\frac{1-\sqrt{3}}{1+\sqrt{3}}$
39. $\sin 15^\circ - \cos 15^\circ =$
 (a) $\frac{1}{\sqrt{2}}$ (b) 1 (c) $\frac{1}{\sqrt{3}}$ (d) $-\frac{1}{\sqrt{2}}$
40. If $\sec x = -\frac{13}{12}, \frac{\pi}{2} < x < \pi$, then the value of $\sin 2x$ is
 (a) $-\frac{120}{169}$ (b) $\frac{120}{169}$ (c) $\frac{120}{119}$ (d) $-\frac{120}{119}$
41. If $0 < \theta < \frac{\pi}{4}$, then $\sqrt{2 - \sqrt{2 + 2 \cos 4\theta}} =$
 (a) $-2 \sin \theta$ (b) $-2 \cos \theta$ (c) $2 \sin \theta$ (d) $2 \cos \theta$
42. If $x = y \cos \frac{2\pi}{3} = z \cos \frac{4\pi}{3}$, then the value of $xy + yz + zx$ is
 (a) 1 (b) 0 (c) -1 (d) $\sqrt{2}$

Question numbers 43 to 45 are Assertion and Reason based questions. Two statements are given, one labelled **Assertion (A)** and the other labelled **Reason (R)**. Select the correct answer from the codes (a), (b), (c) and (d) as given below.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true and Reason (R) is **not** the correct explanation of Assertion (A).
 (c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

43. **Assertion (A) :** For the function $f(x) = 3 - 7 \cos 5x$, the range of $f(x)$ is $[-4, 10]$.

Reason (R) : For all $\theta \in \mathbb{R}$ (set of real numbers), we always have $-1 \leq \cos \theta \leq 1$.

44. **Assertion (A) :** If $(1 + \tan x)(1 + \tan 4x) = 2$, $x \in \left(0, \frac{\pi}{16}\right)$, then $x = \frac{\pi}{20}$.

Reason (R) : If $\alpha = 36^\circ$ and $\beta = 9^\circ$, then $\tan \alpha + \tan \beta + \tan \alpha \tan \beta \neq 1$.

45. **Assertion (A) :** $\cos\left(\frac{3\pi}{2} + x\right) \cos(2\pi + x) \left[\cot\left(\frac{3\pi}{2} - x\right) + \cot(2\pi + x) \right] = 1$.

Reason (R) : π Radians $= 180^\circ$.

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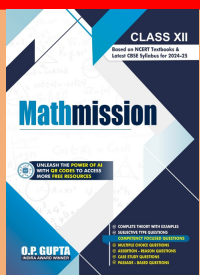
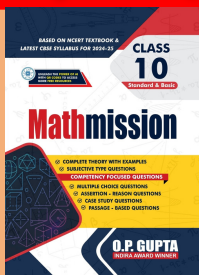
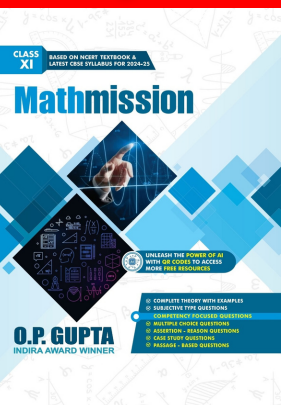
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