

MATHEMATICS · JEE MAIN

Definite Integration

Chapter-wise previous year questions, with answer key

170

PYQS

2020–2025

PAPERS

4

TOPICS

Properties of Definite Integrals

Fundamental Theorem of Calculus

Leibniz Rule

Definite Integral as Limit of Sum

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap “Step-by-step solution” under it for the full working.

Stuck on a question?

Every question has a free step-by-step solution on PrepWiser — tap “Step-by-step solution” under it.

Practise this chapter online with instant answer checking: prepwisar.in/learn · No signup needed to browse

Properties of Definite Integrals · 132 PYQs

Q1 JEE Main 2025 · 8 Apr · Shift 2

The integral $\int_{-1}^{\frac{3}{2}} (|\pi^2 x \sin(\pi x)|) dx$ is equal to:

- (A) $2 + 3\pi$
- (B) $4 + \pi$
- (C) $1 + 3\pi$
- (D) $3 + 2\pi$

[Step-by-step solution ► prepwiser.in/questions/BG34E4Xu6o](https://www.prepwiser.in/questions/BG34E4Xu6o)

Q2 JEE Main 2025 · 8 Apr · Shift 2

Let $f(x)$ be a positive function and $I_1 = \int_{-\frac{1}{2}}^1 2x f(2x(1-2x)) dx$ and $I_2 = \int_{-1}^2 f(x(1-x)) dx$. Then the value of $\frac{I_2}{I_1}$ is equal to _____

- (A) 12
- (B) 9
- (C) 6
- (D) 4

[Step-by-step solution ► prepwiser.in/questions/7aXAbcOGeZ](https://www.prepwiser.in/questions/7aXAbcOGeZ)

Q3 JEE Main 2025 · 7 Apr · Shift 1

The integral $\int_0^\pi \frac{(x+3)\sin x}{1+3\cos^2 x} dx$ is equal to

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

[Step-by-step solution ► prepwiser.in/questions/F8UjLc4RTB](https://www.prepwiser.in/questions/F8UjLc4RTB)

Q4 JEE Main 2025 · 4 Apr · Shift 1

The value of $\int_{-1}^1 \frac{(1+\sqrt{|x|-x})e^x + (\sqrt{|x|-x})e^{-x}}{e^x + e^{-x}} dx$ is equal to

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

[Step-by-step solution ► prepwiser.in/questions/AuoM3RLLny](https://www.prepwiser.in/questions/AuoM3RLLny)

Q5 JEE Main 2025 · 4 Apr · Shift 2

Let $f(x) + 2f\left(\frac{1}{x}\right) = x^2 + 5$ and $2g(x) - 3g\left(\frac{1}{2}\right) = x, x > 0$. If $\alpha = \int_1^2 f(x)dx$, and $\beta = \int_1^2 g(x)dx$, then the value of $9\alpha + \beta$ is :

- (A) 0
- (B) 10
- (C) 1
- (D) 11

[Step-by-step solution ► prepwiser.in/questions/_9BrYUqUaB](https://www.prepwiser.in/questions/_9BrYUqUaB)

Q6 JEE Main 2025 · 3 Apr · Shift 2

The integral $\int_0^\pi \frac{8x dx}{4 \cos^2 x + \sin^2 x}$ is equal to

- (A) $2\pi^2$ (B) $4\pi^2$
(C) π^2 (D) $\frac{3\pi^2}{2}$

[Step-by-step solution ► prepwiser.in/questions/UBfkAGrC-s](https://www.prepwiser.in/questions/UBfkAGrC-s)

Q7 JEE Main 2025 · 3 Apr · Shift 1

Let the domain of the function $f(x) = \log_2 \log_4 \log_6 (3 + 4x - x^2)$ be (a, b) . If $\int_0^{b-a} [x^2] dx = p - \sqrt{q} - \sqrt{r}$, $p, q, r \in \mathbb{N}$, $\gcd(p, q, r) = 1$, where $[\cdot]$ is the greatest integer function, then $p + q + r$ is equal to

- (A) 10 (B) 11
(C) 9 (D) 8

[Step-by-step solution ► prepwiser.in/questions/uiPiFb9Jjw](https://www.prepwiser.in/questions/uiPiFb9Jjw)

Q8 JEE Main 2025 · 2 Apr · Shift 1

Let $[\cdot]$ denote the greatest integer function. If $\int_0^{e^3} \left[\frac{1}{e^{x-1}} \right] dx = \alpha - \log_e 2$, then α^3 is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/A6fuGX2X5X](https://www.prepwiser.in/questions/A6fuGX2X5X)

Q9 JEE Main 2025 · 2 Apr · Shift 2

Let (a, b) be the point of intersection of the curve $x^2 = 2y$ and the straight line $y - 2x - 6 = 0$ in the second quadrant. Then the integral $I = \int_a^b \frac{9x^2}{1+5^x} dx$ is equal to :

- (A) 27 (B) 18
(C) 24 (D) 21

[Step-by-step solution ► prepwiser.in/questions/6sOAEWpecu](https://www.prepwiser.in/questions/6sOAEWpecu)

Q10 JEE Main 2025 · 2 Apr · Shift 2

$4 \int_0^1 \left(\frac{1}{\sqrt{3+x^2} + \sqrt{1+x^2}} \right) dx - 3 \log_e(\sqrt{3})$ is equal to :

- (A) $2 - \sqrt{2} - \log_e(1 + \sqrt{2})$
(B) $2 + \sqrt{2} + \log_e(1 + \sqrt{2})$
(C) $2 + \sqrt{2} - \log_e(1 + \sqrt{2})$
(D) $2 - \sqrt{2} + \log_e(1 + \sqrt{2})$

[Step-by-step solution ► prepwiser.in/questions/cioAmGE8qd](https://www.prepwiser.in/questions/cioAmGE8qd)

Q11 JEE Main 2025 · 29 Jan · Shift 2

If $24 \int_0^{\frac{\pi}{4}} \left[\sin \left| 4x - \frac{\pi}{12} \right| + [2 \sin x] \right] dx = 2\pi + \alpha$, where $[\cdot]$ denotes the greatest integer function, then α is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/Sp0cY68lGj](https://www.prepwiser.in/questions/Sp0cY68lGj)

Q12 JEE Main 2025 · 29 Jan · Shift 1

The integral $80 \int_0^{\frac{\pi}{4}} \left(\frac{\sin \theta + \cos \theta}{9 + 16 \sin 2\theta} \right) d\theta$ is equal to :

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

[Step-by-step solution ► prepwiser.in/questions/8q7jZy9Hwo](https://www.prepwiser.in/questions/8q7jZy9Hwo)

Q13 JEE Main 2025 · 28 Jan · Shift 2

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a twice differentiable function such that $f(2) = 1$. If $F(x) = xf(x)$ for all $x \in \mathbb{R}$, $\int_0^2 xF'(x)dx = 6$ and $\int_0^2 x^2 F''(x)dx = 40$, then $F'(2) + \int_0^2 F(x)dx$ is equal to :

- (A) 13
- (B) 11
- (C) 9
- (D) 15

[Step-by-step solution ► prepwiser.in/questions/u8hYLVgB2d](https://www.prepwiser.in/questions/u8hYLVgB2d)

Q14 JEE Main 2025 · 28 Jan · Shift 1

If $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{96x^2 \cos^2 x}{(1+e^x)} dx = \pi(\alpha\pi^2 + \beta)$, $\alpha, \beta \in \mathbb{Z}$, then $(\alpha + \beta)^2$ equals

- (A) 196
- (B) 100
- (C) 64
- (D) 144

[Step-by-step solution ► prepwiser.in/questions/ii6-d4ihQp](https://www.prepwiser.in/questions/ii6-d4ihQp)

Q15 JEE Main 2025 · 24 Jan · Shift 1

If $I(m, n) = \int_0^1 x^{m-1}(1-x)^{n-1}dx$, $m, n > 0$, then $I(9, 14) + I(10, 13)$ is

- (A) $I(9, 1)$
- (B) $I(1, 13)$
- (C) $I(19, 27)$
- (D) $I(9, 13)$

[Step-by-step solution ► prepwiser.in/questions/s7ORZycnyY](https://www.prepwiser.in/questions/s7ORZycnyY)

Q16 JEE Main 2025 · 23 Jan · Shift 1

The value of $\int_{e^2}^{e^4} \frac{1}{x} \left(\frac{e^{(\log_e x)^2 + 1}}{e^{(\log_e x)^2 + 1} + e^{(6 - \log_e x)^2 + 1}} \right) dx$ is

- (A) 1
- (B) $\log_e 2$
- (C) e^2
- (D) 2

[Step-by-step solution ► prepwiser.in/questions/WE1RGD8Gc_](https://www.prepwiser.in/questions/WE1RGD8Gc_)

Q17 JEE Main 2025 · 23 Jan · Shift 2

If $I = \int_0^{\frac{\pi}{2}} \frac{\sin^{\frac{3}{2}} x}{\sin^{\frac{1}{2}} x + \cos^{\frac{3}{2}} x} dx$, then $\int_0^{2I} \frac{x \sin x \cos x}{\sin^4 x + \cos^4 x} dx$ equals :

- (A) $\frac{\pi^2}{12}$
- (B) $\frac{\pi^2}{4}$
- (C) $\frac{\pi^2}{16}$
- (D) $\frac{\pi^2}{8}$

[Step-by-step solution ► prepwiser.in/questions/8dH_3XJABw](https://www.prepwiser.in/questions/8dH_3XJABw)

Q18 JEE Main 2025 · 22 Jan · Shift 1

Let for $f(x) = 7 \tan^8 x + 7 \tan^6 x - 3 \tan^4 x - 3 \tan^2 x$, $I_1 = \int_0^{\pi/4} f(x) dx$ and $I_2 = \int_0^{\pi/4} x f(x) dx$. Then $7I_1 + 12I_2$ is equal to :

- (A) 2π (B) 1
(C) π (D) 2

[Step-by-step solution ► prepwiser.in/questions/F7RIIsXT5g](https://www.prepwiser.in/questions/F7RIIsXT5g)

Q19 JEE Main 2024 · 9 Apr · Shift 2

The value of the integral $\int_{-1}^2 \log_e (x + \sqrt{x^2 + 1}) dx$ is

- (A) $\sqrt{5} - \sqrt{2} + \log_e \left(\frac{7+4\sqrt{5}}{1+\sqrt{2}} \right)$
(B) $\sqrt{2} - \sqrt{5} + \log_e \left(\frac{7+4\sqrt{5}}{1+\sqrt{2}} \right)$
(C) $\sqrt{5} - \sqrt{2} + \log_e \left(\frac{9+4\sqrt{5}}{1+\sqrt{2}} \right)$
(D) $\sqrt{2} - \sqrt{5} + \log_e \left(\frac{9+4\sqrt{5}}{1+\sqrt{2}} \right)$

[Step-by-step solution ► prepwiser.in/questions/pbsf8SpUjq](https://www.prepwiser.in/questions/pbsf8SpUjq)

Q20 JEE Main 2024 · 9 Apr · Shift 2

The integral

$$\int_{1/4}^{3/4} \cos \left(2 \cot^{-1} \sqrt{\frac{1-x}{1+x}} \right) dx$$

is equal to

- (A) $-1/2$ (B) $-1/4$
(C) $1/4$ (D) $1/2$

[Step-by-step solution ► prepwiser.in/questions/otHB9cB-RW](https://www.prepwiser.in/questions/otHB9cB-RW)

Q21 JEE Main 2024 · 6 Apr · Shift 2

Let $[t]$ denote the largest integer less than or equal to t . If

$$\int_0^3 \left([x^2] + \left[\frac{x^2}{2} \right] \right) dx = a + b\sqrt{2} - \sqrt{3} - \sqrt{5} + c\sqrt{6} - \sqrt{7}$$

, where $a, b, c \in \mathbf{Z}$, then $a + b + c$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/X60ui1zXDY](https://www.prepwiser.in/questions/X60ui1zXDY)

$$\int_0^{\pi/4} \frac{\cos^2 x \sin^2 x}{(\cos^3 x + \sin^3 x)^2} dx \text{ is equal to}$$

(A) 1/9

(B) 1/6

(C) 1/3

(D) 1/12

Step-by-step solution ► [prepwiser.in/questions/4eG4EH7AdM](https://www.prepwiser.in/questions/4eG4EH7AdM)

The value of $\int_{-\pi}^{\pi} \frac{2y(1+\sin y)}{1+\cos^2 y} dy$ is :

(A) $\frac{\pi}{2}$ (B) π^2 (C) $\frac{\pi^2}{2}$ (D) $2\pi^2$

Step-by-step solution ► [prepwiser.in/questions/d5T04XIEAr](https://www.prepwiser.in/questions/d5T04XIEAr)

Let

$$\beta(m, n) = \int_0^1 x^{m-1} (1-x)^{n-1} dx, m, n > 0$$

. If

$$\int_0^1 (1-x^{10})^{20} dx = a \times \beta(b, c)$$

, then $100(a + b + c)$ equals _____.

(A) 2012

(B) 1021

(C) 1120

(D) 2120

Step-by-step solution ► [prepwiser.in/questions/YKC_HJp3CM](https://www.prepwiser.in/questions/YKC_HJp3CM)

If

$$f(t) = \int_0^{\pi} \frac{2x dx}{1 - \cos^2 t \sin^2 x}, 0 < t < \pi$$

, then the value of $\int_0^{\frac{\pi}{2}} \frac{\pi^2 dt}{f(t)}$ equals _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/zHWpiAwwkz](https://www.prepwiser.in/questions/zHWpiAwwkz)

Q26 JEE Main 2024 · 5 Apr · Shift 1

The integral $\int_0^{\pi/4} \frac{136 \sin x}{3 \sin x + 5 \cos x} dx$ is equal to :

- (A) $3\pi - 50 \log_e 2 + 20 \log_e 5$
(B) $3\pi - 25 \log_e 2 + 10 \log_e 5$
(C) $3\pi - 10 \log_e(2\sqrt{2}) + 10 \log_e 5$
(D) $3\pi - 30 \log_e 2 + 20 \log_e 5$

[Step-by-step solution ► prepwiser.in/questions/73f23v_Nx2](https://www.prepwiser.in/questions/73f23v_Nx2)

Q27 JEE Main 2024 · 4 Apr · Shift 2

If the value of the integral $\int_{-1}^1 \frac{\cos \alpha x}{1+3^x} dx$ is $\frac{2}{\pi}$. Then, a value of α is

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

[Step-by-step solution ► prepwiser.in/questions/Wv5hcg0bqA](https://www.prepwiser.in/questions/Wv5hcg0bqA)

Q28 JEE Main 2024 · 4 Apr · Shift 1

If

$$\int_0^{\frac{\pi}{4}} \frac{\sin^2 x}{1 + \sin x \cos x} dx = \frac{1}{a} \log_e \left(\frac{a}{3} \right) + \frac{\pi}{b\sqrt{3}}$$

, where $a, b \in \mathbb{N}$, then $a + b$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/k9CyYB3DZ5](https://www.prepwiser.in/questions/k9CyYB3DZ5)

Q29 JEE Main 2024 · 1 Feb · Shift 2

The value of $\int_0^1 (2x^3 - 3x^2 - x + 1)^{\frac{1}{3}} dx$ is equal to :

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

[Step-by-step solution ► prepwiser.in/questions/0mhBG1EjgF](https://www.prepwiser.in/questions/0mhBG1EjgF)

Q30 JEE Main 2024 · 1 Feb · Shift 1

The value of the integral $\int_0^{\pi/4} \frac{x dx}{\sin^4(2x) + \cos^4(2x)}$ equals :

- (A) $\frac{\sqrt{2}\pi^2}{8}$ (B) $\frac{\sqrt{2}\pi^2}{16}$
(C) $\frac{\sqrt{2}\pi^2}{32}$ (D) $\frac{\sqrt{2}\pi^2}{64}$

[Step-by-step solution ► prepwiser.in/questions/9DHS6G7Rjj](https://www.prepwiser.in/questions/9DHS6G7Rjj)

Q31 JEE Main 2024 · 1 Feb · Shift 1

If $\int_{-\pi/2}^{\pi/2} \frac{8\sqrt{2} \cos x dx}{(1+e^{\sin x})(1+\sin^4 x)} = \alpha\pi + \beta \log_e(3 + 2\sqrt{2})$, where α, β are integers, then $\alpha^2 + \beta^2$ equals :

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/qyyUxxwAHj](https://www.prepwiser.in/questions/qyyUxxwAHj)

Q32 JEE Main 2024 · 1 Feb · Shift 2

If $\int_0^{\frac{\pi}{3}} \cos^4 x dx = a\pi + b\sqrt{3}$, where a and b are rational numbers, then $9a + 8b$ is equal to :

(A) 2

(B) 1

(C) 3

(D) $\frac{3}{2}$

[Step-by-step solution ► prepwiser.in/questions/sk0saAnd_Q](https://www.prepwiser.in/questions/sk0saAnd_Q)

Q33 JEE Main 2024 · 31 Jan · Shift 2

Let $f, g : (0, \infty) \rightarrow \mathbb{R}$ be two functions defined by $f(x) = \int_{-x}^x (|t| - t^2) e^{-t^2} dt$ and $g(x) = \int_0^{x^2} t^{1/2} e^{-t} dt$. Then, the value of $9(f(\sqrt{\log_e 9}) + g(\sqrt{\log_e 9}))$ is equal to :

(A) 10

(B) 9

(C) 8

(D) 6

[Step-by-step solution ► prepwiser.in/questions/ymUSbs04wW](https://www.prepwiser.in/questions/ymUSbs04wW)

Q34 JEE Main 2024 · 31 Jan · Shift 1

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a function defined by $f(x) = \frac{4^x}{4x+2}$ and

$$M = \int_{f(a)}^{f(1-a)} x \sin^4(x(1-x)) dx, N = \int_{f(a)}^{f(1-a)} \sin^4(x(1-x)) dx; a \neq \frac{1}{2}$$

. If $\alpha M = \beta N, \alpha, \beta \in \mathbb{N}$, then the least value of $\alpha^2 + \beta^2$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/XDTTYqsz3A](https://www.prepwiser.in/questions/XDTTYqsz3A)

Q35 JEE Main 2024 · 31 Jan · Shift 1

If the integral

$$525 \int_0^{\frac{\pi}{2}} \sin 2x \cos^{\frac{11}{2}} x \left(1 + \cos^{\frac{5}{2}} x\right)^{\frac{1}{2}} dx$$

is equal to $(n\sqrt{2} - 64)$, then n is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/p_1Fi4dumg](https://www.prepwiser.in/questions/p_1Fi4dumg)

Q36 JEE Main 2024 · 31 Jan · Shift 2

$$\left| \frac{120}{\pi^3} \int_0^{\pi} \frac{x^2 \sin x \cos x}{\sin^4 x + \cos^4 x} dx \right| \text{ is equal to}$$

_____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/V1h7JeJMzq](https://www.prepwiser.in/questions/V1h7JeJMzq)

Q37 JEE Main 2024 · 30 Jan · Shift 2

Let $y = f(x)$ be a thrice differentiable function in $(-5, 5)$. Let the tangents to the curve $y = f(x)$ at $(1, f(1))$ and $(3, f(3))$ make angles $\pi/6$ and $\pi/4$, respectively with positive x -axis. If

$$27 \int_1^3 \left((f'(t))^2 + 1 \right) f''(t) dt = \alpha + \beta\sqrt{3}$$

where α, β are integers, then the value of $\alpha + \beta$ equals

- (A) 26 (B) -16
(C) 36 (D) -14

[Step-by-step solution ► prepwisar.in/questions/1-IWHBcDKt](https://www.prepwisar.in/questions/1-IWHBcDKt)

Q38 JEE Main 2024 · 29 Jan · Shift 1

If the value of the integral

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(\frac{x^2 \cos x}{1 + \pi^x} + \frac{1 + \sin^2 x}{1 + e^{\sin x^{2123}}} \right) dx = \frac{\pi}{4}(\pi + a) - 2$$

, then the value of a is

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

[Step-by-step solution ► prepwisar.in/questions/m-J8VpQEEJ](https://www.prepwisar.in/questions/m-J8VpQEEJ)

Q39 JEE Main 2024 · 29 Jan · Shift 2

If

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sqrt{1 - \sin 2x} dx = \alpha + \beta\sqrt{2} + \gamma\sqrt{3}$$

, where α, β and γ are rational numbers, then $3\alpha + 4\beta - \gamma$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/IBxhEn5dot](https://www.prepwisar.in/questions/IBxhEn5dot)

Q40 JEE Main 2024 · 27 Jan · Shift 2

Let

$$f(x) = \int_0^x g(t) \log_e \left(\frac{1-t}{1+t} \right) dt$$

, where g is a continuous odd function. If

$$\int_{-\pi/2}^{\pi/2} \left(f(x) + \frac{x^2 \cos x}{1+e^x} \right) dx = \left(\frac{\pi}{\alpha} \right)^2 - \alpha$$

, then α is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/ohIF8g-xHK](https://www.prepwiser.in/questions/ohIF8g-xHK)

Q41 JEE Main 2023 · 15 Apr · Shift 1

If $\int_0^1 \frac{1}{(5+2x-2x^2)(1+e^{(2-4x)})} dx = \frac{1}{\alpha} \log_e \left(\frac{\alpha+1}{\beta} \right)$, $\alpha, \beta > 0$, then $\alpha^4 - \beta^4$ is equal to :

(A) -21

(B) 21

(C) 19

(D) 0

[Step-by-step solution ► prepwiser.in/questions/ZYFUL2NPYA](https://www.prepwiser.in/questions/ZYFUL2NPYA)

Q42 JEE Main 2023 · 13 Apr · Shift 2

Let

$$f_n = \int_0^{\frac{\pi}{2}} \left(\sum_{k=1}^n \sin^{k-1} x \right) \left(\sum_{k=1}^n (2k-1) \sin^{k-1} x \right) \cos x dx, n \in \mathbb{N}$$

. Then $f_{21} - f_{20}$ is equal to _____

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/sDan_ffh2](https://www.prepwiser.in/questions/sDan_ffh2)

Q43 JEE Main 2023 · 13 Apr · Shift 1

$$\int_0^{\infty} \frac{6}{e^{3x} + 6e^{2x} + 11e^x + 6} dx =$$

(A) $\log_e \left(\frac{256}{81} \right)$

(B) $\log_e \left(\frac{64}{27} \right)$

(C) $\log_e \left(\frac{32}{27} \right)$

(D) $\log_e \left(\frac{512}{81} \right)$

[Step-by-step solution ► prepwiser.in/questions/ShoLIYf74I](https://www.prepwiser.in/questions/ShoLIYf74I)

Q44 JEE Main 2023 · 13 Apr · Shift 1

Let for $x \in \mathbb{R}$, $S_0(x) = x$, $S_k(x) = C_k x + k \int_0^x S_{k-1}(t) dt$, where

$C_0 = 1$, $C_k = 1 - \int_0^1 S_{k-1}(x) dx$, $k = 1, 2, 3, \dots$. Then $S_2(3) + 6C_3$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/VQsNujLuDo](https://www.prepwiser.in/questions/VQsNujLuDo)

Q45 JEE Main 2023 · 13 Apr · Shift 2

The value of

$$\frac{e^{-\frac{\pi}{4}} + \int_0^{\frac{\pi}{4}} e^{-x} \tan^{50} x dx}{\int_0^{\frac{\pi}{4}} e^{-x} (\tan^{49} x + \tan^{51} x) dx}$$

is

(A) 51

(B) 50

(C) 25

(D) 49

[Step-by-step solution ► prepwiser.in/questions/rqJT3Gnfv6](https://www.prepwiser.in/questions/rqJT3Gnfv6)

Q46 JEE Main 2023 · 12 Apr · Shift 1

If $\int_{-0.15}^{0.15} |100x^2 - 1| dx = \frac{k}{3000}$, then k is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/4tcWhZC93_](https://www.prepwiser.in/questions/4tcWhZC93_)

Q47 JEE Main 2023 · 11 Apr · Shift 2

Let the function $f : [0, 2] \rightarrow \mathbb{R}$ be defined as

$$f(x) = \begin{cases} e^{\min\{x^2, x - [x]\}}, & x \in [0, 1) \\ e^{[x - \log_e x]}, & x \in [1, 2] \end{cases}$$

where $[t]$ denotes the greatest integer less than or equal to t . Then the value of the integral $\int_0^2 x f(x) dx$ is :

(A) $2e - 1$

(B) $2e - \frac{1}{2}$

(C) $1 + \frac{3e}{2}$

(D) $(e - 1) \left(e^2 + \frac{1}{2}\right)$

[Step-by-step solution ► prepwiser.in/questions/-xXv46FdCc](https://www.prepwiser.in/questions/-xXv46FdCc)

Q48 JEE Main 2023 · 11 Apr · Shift 2

If $f : \mathbb{R} \rightarrow \mathbb{R}$ be a continuous function satisfying

$$\int_0^{\frac{\pi}{2}} f(\sin 2x) \sin x dx + \alpha \int_0^{\frac{\pi}{4}} f(\cos 2x) \cos x dx = 0$$

, then the value of α is :

(A) $-\sqrt{3}$

(B) $\sqrt{2}$

(C) $-\sqrt{2}$

(D) $\sqrt{3}$

[Step-by-step solution ► prepwiser.in/questions/nJYxyHwom4](https://www.prepwiser.in/questions/nJYxyHwom4)

The value of the integral

$$\int_{-\log_e 2}^{\log_e 2} e^x \left(\log_e \left(e^x + \sqrt{1 + e^{2x}} \right) \right) dx$$

is equal to :

(A) $\log_e \left(\frac{(2 + \sqrt{5})^2}{\sqrt{1 + \sqrt{5}}} \right) + \frac{\sqrt{5}}{2}$

(B) $\log_e \left(\frac{\sqrt{2}(2 + \sqrt{5})^2}{\sqrt{1 + \sqrt{5}}} \right) - \frac{\sqrt{5}}{2}$

(C) $\log_e \left(\frac{2(2 + \sqrt{5})}{\sqrt{1 + \sqrt{5}}} \right) - \frac{\sqrt{5}}{2}$

(D) $\log_e \left(\frac{\sqrt{2}(3 - \sqrt{5})^2}{\sqrt{1 + \sqrt{5}}} \right) + \frac{\sqrt{5}}{2}$

[Step-by-step solution ► prepwiser.in/questions/P37kiSxwFv](https://www.prepwiser.in/questions/P37kiSxwFv)

Let $[t]$ denote the greatest integer function. If

$$\int_0^{2.4} [x^2] dx = \alpha + \beta\sqrt{2} + \gamma\sqrt{3} + \delta\sqrt{5}$$

, then $\alpha + \beta + \gamma + \delta$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/6PR4hbVDxT](https://www.prepwiser.in/questions/6PR4hbVDxT)

Let $[t]$ denote the greatest integer $\leq t$. Then

$$\frac{2}{\pi} \int_{\pi/6}^{5\pi/6} (8[\operatorname{cosec} x] - 5[\cot x]) dx$$

is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/9KII7NopQY](https://www.prepwiser.in/questions/9KII7NopQY)

Q52 JEE Main 2023 · 6 Apr · Shift 2

Let $f(x)$ be a function satisfying $f(x) + f(\pi - x) = \pi^2, \forall x \in \mathbb{R}$. Then $\int_0^\pi f(x) \sin x dx$ is equal to :

- (A) π^2 (B) $\frac{\pi^2}{2}$
(C) $2\pi^2$ (D) $\frac{\pi^2}{4}$

[Step-by-step solution ► prepwiser.in/questions/8H1RyBHSIn](https://www.prepwiser.in/questions/8H1RyBHSIn)

Q53 JEE Main 2023 · 1 Feb · Shift 1

If

$$\int_0^1 (x^{21} + x^{14} + x^7) (2x^{14} + 3x^7 + 6)^{1/7} dx = \frac{1}{l}(11)^{m/n}$$

where $l, m, n \in \mathbb{N}$, m and n are coprime then $l + m + n$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/UupflZYJvy](https://www.prepwiser.in/questions/UupflZYJvy)

Q54 JEE Main 2023 · 1 Feb · Shift 2

If

$$\int_0^\pi \frac{5^{\cos x} (1 + \cos x \cos 3x + \cos^2 x + \cos^3 x \cos 3x) dx}{1 + 5^{\cos x}} = \frac{k\pi}{16}$$

, then k is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/a783hpJSmj](https://www.prepwiser.in/questions/a783hpJSmj)

Q55 JEE Main 2023 · 1 Feb · Shift 2

The value of the integral

$$\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \frac{x + \frac{\pi}{4}}{2 - \cos 2x} dx$$

is :

- (A) $\frac{\pi^2}{6\sqrt{3}}$ (B) $\frac{\pi^2}{6}$
(C) $\frac{\pi^2}{3\sqrt{3}}$ (D) $\frac{\pi^2}{12\sqrt{3}}$

[Step-by-step solution ► prepwiser.in/questions/erZSqNgV4c](https://www.prepwiser.in/questions/erZSqNgV4c)

Q56 JEE Main 2023 · 31 Jan · Shift 1

Let $\alpha \in (0, 1)$ and $\beta = \log_e(1 - \alpha)$. Let

$$P_n(x) = x + \frac{x^2}{2} + \frac{x^3}{3} + \dots + \frac{x^n}{n}, x \in (0, 1)$$

. Then the integral $\int_0^\alpha \frac{t^{50}}{1-t} dt$ is equal to

- (A) $-(\beta + P_{50}(\alpha))$
- (B) $\beta - P_{50}(\alpha)$
- (C) $P_{50}(\alpha) - \beta$
- (D) $\beta + P_{50} - (\alpha)$

[Step-by-step solution ► prepwiser.in/questions/rpEw4qUW0I](https://www.prepwiser.in/questions/rpEw4qUW0I)

Q57 JEE Main 2023 · 29 Jan · Shift 2

The value of the integral $\int_{1/2}^2 \frac{\tan^{-1}x}{x} dx$ is equal to :

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

[Step-by-step solution ► prepwiser.in/questions/xVFErgBpOn](https://www.prepwiser.in/questions/xVFErgBpOn)

Q58 JEE Main 2023 · 29 Jan · Shift 1

Let

$$f(x) = x + \frac{a}{\pi^2 - 4} \sin x + \frac{b}{\pi^2 - 4} \cos x, x \in R$$

be a function which

satisfies $f(x) = x + \int_0^{\pi/2} \sin(x+y)f(y)dy$. then $(a+b)$ is equal to

- (A) $-2\pi(\pi + 2)$
- (B) $-\pi(\pi - 2)$
- (C) $-\pi(\pi + 2)$
- (D) $-2\pi(\pi - 2)$

[Step-by-step solution ► prepwiser.in/questions/368WztgeB1](https://www.prepwiser.in/questions/368WztgeB1)

Q59 JEE Main 2023 · 29 Jan · Shift 2

The value of the integral $\int_1^2 \left(\frac{t^4+1}{t^6+1} \right) dt$ is

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

[Step-by-step solution ► prepwiser.in/questions/vhi-T9HDhv](https://www.prepwiser.in/questions/vhi-T9HDhv)

Q60 JEE Main 2023 · 25 Jan · Shift 1

The minimum value of the function $f(x) = \int_0^2 e^{|x-t|} dt$ is :

- (A) 2 (B) $2(e - 1)$
(C) $e(e - 1)$ (D) $2e - 1$

[Step-by-step solution ► prepwiser.in/questions/GgNPcLa8z7](https://www.prepwiser.in/questions/GgNPcLa8z7)

Q61 JEE Main 2023 · 25 Jan · Shift 2

If

$$\int_{\frac{1}{3}}^3 |\log_e x| dx = \frac{m}{n} \log_e \left(\frac{n^2}{e} \right)$$

, where m and n are coprime natural numbers, then $m^2 + n^2 - 5$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/A5JMGUexUm](https://www.prepwiser.in/questions/A5JMGUexUm)

Q62 JEE Main 2023 · 24 Jan · Shift 1

The value of

$$\frac{8}{\pi} \int_0^{\frac{\pi}{2}} \frac{(\cos x)^{2023}}{(\sin x)^{2023} + (\cos x)^{2023}} dx$$

is _____

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/9kpTFPQSmS](https://www.prepwiser.in/questions/9kpTFPQSmS)

Q63 JEE Main 2022 · 29 Jul · Shift 1

If

$$f(\alpha) = \int_1^\alpha \frac{\log_{10} t}{1+t} dt, \alpha > 0$$

, then $f(e^3) + f(e^{-3})$ is equal to :

- (A) 9 (B) $\frac{9}{2}$
(C) $\frac{9}{\log_e(10)}$ (D) $\frac{9}{2 \log_e(10)}$

[Step-by-step solution ► prepwiser.in/questions/2vIbet46yq](https://www.prepwiser.in/questions/2vIbet46yq)

Q64 JEE Main 2022 · 29 Jul · Shift 1

The integral $\int_0^{\frac{\pi}{2}} \frac{1}{3+2\sin x + \cos x} dx$ is equal to :

- (A) $\tan^{-1}(2)$
(B) $\tan^{-1}(2) - \frac{\pi}{4}$
(C) $\frac{1}{2} \tan^{-1}(2) - \frac{\pi}{8}$
(D) $\frac{1}{2}$

Step-by-step solution ► [prepwisser.in/questions/ylyRPEkpXf](https://www.prepwisser.in/questions/ylyRPEkpXf)

Q65 JEE Main 2022 · 28 Jul · Shift 2

Let $I_n(x) = \int_0^x \frac{1}{(t^2+5)^n} dt, n = 1, 2, 3, \dots$. Then :

- (A) $50I_6 - 9I_5 = xI'_5$ (B) $50I_6 - 11I_5 = xI'_5$
(C) $50I_6 - 9I_5 = I'_5$ (D) $50I_6 - 11I_5 = I'_5$

Step-by-step solution ► [prepwisser.in/questions/3A7xd8hSw9](https://www.prepwisser.in/questions/3A7xd8hSw9)

Q66 JEE Main 2022 · 28 Jul · Shift 2

The value of the integral $\int_0^{\frac{\pi}{2}} 60 \frac{\sin(6x)}{\sin x} dx$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwisser.in/questions/52BuA9l5ES](https://www.prepwisser.in/questions/52BuA9l5ES)

Q67 JEE Main 2022 · 27 Jul · Shift 1

Let $I = \int_{\pi/4}^{\pi/3} \left(\frac{8\sin x - \sin 2x}{x} \right) dx$. Then

- (A) $\frac{\pi}{2} < I < \frac{3\pi}{4}$
(B) $\frac{\pi}{5} < I < \frac{5\pi}{12}$
(C) $\frac{5\pi}{12} < I < \frac{\sqrt{2}}{3}\pi$
(D) $\frac{3\pi}{4} < I < \pi$

Step-by-step solution ► [prepwisser.in/questions/cZ60TL3HQQ](https://www.prepwisser.in/questions/cZ60TL3HQQ)

Q68 JEE Main 2022 · 27 Jul · Shift 2

$$\int_0^2 \left(|2x^2 - 3x| + \left[x - \frac{1}{2} \right] \right) dx$$

, where $[t]$ is the greatest integer function, is equal to :

- (A) $\frac{7}{6}$ (B) $\frac{19}{12}$
(C) $\frac{31}{12}$ (D) $\frac{3}{2}$

Step-by-step solution ► [prepwisser.in/questions/tK7q8QDG91](https://www.prepwisser.in/questions/tK7q8QDG91)

Q69 JEE Main 2022 · 26 Jul · Shift 1

If

$$n(2n+1) \int_0^1 (1-x^n)^{2n} dx = 1177 \int_0^1 (1-x^n)^{2n+1} dx$$

, then $n \in \mathbf{N}$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/ongoSAYTK1](https://www.prepwiser.in/questions/ongoSAYTK1)

Q70 JEE Main 2022 · 26 Jul · Shift 2

$\int_0^{20\pi} (|\sin x| + |\cos x|)^2 dx$ is equal to

(A) $10(\pi + 4)$

(B) $10(\pi + 2)$

(C) $20(\pi - 2)$

(D) $20(\pi + 2)$

[Step-by-step solution ► prepwiser.in/questions/FkSW_PjecB](https://www.prepwiser.in/questions/FkSW_PjecB)

Q71 JEE Main 2022 · 25 Jul · Shift 2

Let $[t]$ denote the greatest integer less than or equal to t . Then the value of the integral

$\int_{-3}^{101} ([\sin(\pi x)] + e^{[\cos(2\pi x)]}) dx$ is equal to

(A) $\frac{52(1-e)}{e}$

(B) $\frac{52}{e}$

(C) $\frac{52(2+e)}{e}$

(D) $\frac{104}{e}$

[Step-by-step solution ► prepwiser.in/questions/dmITFZzcXj](https://www.prepwiser.in/questions/dmITFZzcXj)

Q72 JEE Main 2022 · 29 Jun · Shift 1

$$\int_0^5 \cos \left(\pi \left(x - \left[\frac{x}{2} \right] \right) \right) dx$$

,
where $[t]$ denotes greatest integer less than or equal to t , is equal to:

(A) -3

(B) -2

(C) 2

(D) 0

[Step-by-step solution ► prepwiser.in/questions/hlb3L5SPmf](https://www.prepwiser.in/questions/hlb3L5SPmf)

If

$$\int_0^2 (\sqrt{2x} - \sqrt{2x - x^2}) dx = \int_0^1 \left(1 - \sqrt{1 - y^2} - \frac{y^2}{2}\right) dy + \int_1^2 \left(2 - \frac{y^2}{2}\right) dy + I$$

, then I equals

- (A) $\int_0^1 (1 + \sqrt{1 - y^2}) dy$
 (B) $\int_0^1 \left(\frac{y^2}{2} - \sqrt{1 - y^2} + 1\right) dy$
 (C) $\int_0^1 (1 - \sqrt{1 - y^2}) dy$
 (D) $\int_0^1 \left(\frac{y^2}{2} + \sqrt{1 - y^2} + 1\right) dy$

[Step-by-step solution ► prepwiser.in/questions/nrCGq7S35P](https://www.prepwiser.in/questions/nrCGq7S35P)

Let f be a real valued continuous function on $[0, 1]$ and $f(x) = x + \int_0^1 (x - t)f(t)dt$.

Then, which of the following points (x, y) lies on the curve $y = f(x)$?

- (A) (2, 4) (B) (1, 2)
 (C) (4, 17) (D) (6, 8)

[Step-by-step solution ► prepwiser.in/questions/CjbC8RBO9x](https://www.prepwiser.in/questions/CjbC8RBO9x)

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a differentiable function such that

$$f\left(\frac{\pi}{4}\right) = \sqrt{2}, f\left(\frac{\pi}{2}\right) = 0$$

and $f'\left(\frac{\pi}{2}\right) = 1$ and

let $g(x) = \int_x^{\pi/4} (f'(t) \sec t + \tan t \sec t f(t)) dt$ for $x \in \left[\frac{\pi}{4}, \frac{\pi}{2}\right)$. Then $\lim_{x \rightarrow \left(\frac{\pi}{2}\right)^-} g(x)$ is equal to :

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

[Step-by-step solution ► prepwiser.in/questions/_QZb-j1YEA](https://www.prepwiser.in/questions/_QZb-j1YEA)

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a continuous function satisfying $f(x) + f(x + k) = n$, for all $x \in \mathbb{R}$ where $k > 0$ and n is a positive integer. If $I_1 = \int_0^{4nk} f(x)dx$ and $I_2 = \int_{-k}^{3k} f(x)dx$, then :

- (A) $I_1 + 2I_2 = 4nk$ (B) $I_1 + 2I_2 = 2nk$
 (C) $I_1 + nI_2 = 4n^2k$ (D) $I_1 + nI_2 = 6n^2k$

[Step-by-step solution ► prepwiser.in/questions/6LAgAy6hp2](https://www.prepwiser.in/questions/6LAgAy6hp2)

Q77 JEE Main 2022 · 27 Jun · Shift 1

The value of the integral

$$\int_{-2}^2 \frac{|x^3+x|}{(e^{x|x|}+1)} dx \text{ is equal to :}$$

- (A) $5e^2$
- (B) $3e^{-2}$
- (C) 4
- (D) 6

[Step-by-step solution ► prepwiset.in/questions/HJuIBDySVR](https://www.prepwiset.in/questions/HJuIBDySVR)

Q78 JEE Main 2022 · 27 Jun · Shift 2

The integral $\int_0^1 \frac{1}{7\left[\frac{1}{x}\right]} dx$, where $[\cdot]$ denotes the greatest integer function, is equal to

- (A) $1 + 6\log_e\left(\frac{6}{7}\right)$
- (B) $1 - 6\log_e\left(\frac{6}{7}\right)$
- (C) $\log_e\left(\frac{7}{6}\right)$
- (D) $1 - 7\log_e\left(\frac{6}{7}\right)$

[Step-by-step solution ► prepwiset.in/questions/owbVeQFYPR](https://www.prepwiset.in/questions/owbVeQFYPR)

Q79 JEE Main 2022 · 26 Jun · Shift 1

The value of the integral

$$\frac{48}{\pi^4} \int_0^{\pi} \left(\frac{3\pi x^2}{2} - x^3 \right) \frac{\sin x}{1 + \cos^2 x} dx$$

is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiset.in/questions/9VN-pTPwiS](https://www.prepwiset.in/questions/9VN-pTPwiS)

Q80 JEE Main 2022 · 26 Jun · Shift 2

The integral

$$\frac{24}{\pi} \int_0^{\sqrt{2}} \frac{(2-x^2)dx}{(2+x^2)\sqrt{4+x^4}}$$

is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiset.in/questions/uCsKJfcrJL](https://www.prepwiset.in/questions/uCsKJfcrJL)

Q81 JEE Main 2022 · 25 Jun · Shift 2

If $b_n = \int_0^{\frac{\pi}{2}} \frac{\cos^2 nx}{\sin x} dx$, $n \in N$, then

- (A) $b_3 - b_2$, $b_4 - b_3$, $b_5 - b_4$ are in A.P. with common difference -2
(B) $\frac{1}{b_3 - b_2}$, $\frac{1}{b_4 - b_3}$, $\frac{1}{b_5 - b_4}$ are in an A.P. with common difference 2
(C) $b_3 - b_2$, $b_4 - b_3$, $b_5 - b_4$ are in a G.P.
(D) $\frac{1}{b_3 - b_2}$, $\frac{1}{b_4 - b_3}$, $\frac{1}{b_5 - b_4}$ are in an A.P. with common difference -2

[Step-by-step solution](https://www.prepwiser.in/questions/fHPuSCrqvE) ► [prepwiser.in/questions/fHPuSCrqvE](https://www.prepwiser.in/questions/fHPuSCrqvE)

Q82 JEE Main 2022 · 25 Jun · Shift 1

The value of

$$\int_0^{\pi} \frac{e^{\cos x} \sin x}{(1 + \cos^2 x)(e^{\cos x} + e^{-\cos x})} dx$$

is equal to:

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

[Step-by-step solution](https://www.prepwiser.in/questions/eryiTOTklf) ► [prepwiser.in/questions/eryiTOTklf](https://www.prepwiser.in/questions/eryiTOTklf)

Q83 JEE Main 2022 · 24 Jun · Shift 1

Let

$$f(\theta) = \sin \theta + \int_{-\pi/2}^{\pi/2} (\sin \theta + t \cos \theta) f(t) dt$$

. Then the value of $\left| \int_0^{\pi/2} f(\theta) d\theta \right|$ is _____.

Numerical answer — enter the value.

[Step-by-step solution](https://www.prepwiser.in/questions/H0Cqs2UXEf) ► [prepwiser.in/questions/H0Cqs2UXEf](https://www.prepwiser.in/questions/H0Cqs2UXEf)

Let

$$\text{Max}_{0 \leq x \leq 2} \left\{ \frac{9 - x^2}{5 - x} \right\} = \alpha$$

and

$$\text{Min}_{0 \leq x \leq 2} \left\{ \frac{9 - x^2}{5 - x} \right\} = \beta$$

.

If

$$\int_{\beta - \frac{8}{3}}^{2\alpha - 1} \text{Max} \left\{ \frac{9 - x^2}{5 - x}, x \right\} dx = \alpha_1 + \alpha_2 \log_e \left(\frac{8}{15} \right)$$

then $\alpha_1 + \alpha_2$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/CxI89H3k89](https://www.prepwisar.in/questions/CxI89H3k89)

The value of the integral

$$\int_{-\pi/2}^{\pi/2} \frac{dx}{(1 + e^x)(\sin^6 x + \cos^6 x)}$$

is equal to

(A) 2π

(B) 0

(C) π

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

[Step-by-step solution ► prepwisar.in/questions/QEBZO2oVuZ](https://www.prepwisar.in/questions/QEBZO2oVuZ)

The function $f(x)$, that satisfies the condition

$$f(x) = x + \int_0^{\pi/2} \sin x \cdot \cos y f(y) dy, \text{ is :}$$

(A) $x + \frac{2}{3}(\pi - 2) \sin x$

(B) $x + (\pi + 2) \sin x$

(C) $x + \frac{\pi}{2} \sin x$

(D) $x + (\pi - 2) \sin x$

[Step-by-step solution ► prepwisar.in/questions/3-ALYfg9on](https://www.prepwisar.in/questions/3-ALYfg9on)

Q87 JEE Main 2021 · 31 Aug · Shift 1

Let $[t]$ denote the greatest integer $\leq t$. Then the value of

8. $\int_{-\frac{1}{2}}^1 ([2x] + |x|) dx$ is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/dC-eSk2zIc](https://www.prepwiser.in/questions/dC-eSk2zIc)

Q88 JEE Main 2021 · 31 Aug · Shift 2

If $[x]$ is the greatest integer $\leq x$, then

$$\pi^2 \int_0^2 \left(\sin \frac{\pi x}{2} \right) (x - [x])^{[x]} dx$$

is equal to :

(A) $2(\pi - 1)$

(B) $4(\pi - 1)$

(C) $4(\pi + 1)$

(D) $2(\pi + 1)$

[Step-by-step solution ► prepwiser.in/questions/xNiOAIA-Ly](https://www.prepwiser.in/questions/xNiOAIA-Ly)

Q89 JEE Main 2021 · 27 Aug · Shift 1

$$\int_6^{16} \frac{\log_e x^2}{\log_e x^2 + \log_e (x^2 - 44x + 484)} dx$$

is equal to :

(A) 6

(B) 8

(C) 5

(D) 10

[Step-by-step solution ► prepwiser.in/questions/5cGullh02d](https://www.prepwiser.in/questions/5cGullh02d)

Q90 JEE Main 2021 · 26 Aug · Shift 2

If the value of the integral

$$\int_0^5 \frac{x + [x]}{e^{x-[x]}} dx = \alpha e^{-1} + \beta$$

, where $\alpha, \beta \in \mathbb{R}$, $5\alpha + 6\beta = 0$, and $[x]$ denotes the greatest integer less than or equal to x ; then the value of $(\alpha + \beta)^2$ is equal to :

(A) 100

(B) 25

(C) 16

(D) 36

[Step-by-step solution ► prepwiser.in/questions/stOm2KXrH8](https://www.prepwiser.in/questions/stOm2KXrH8)

Q91 JEE Main 2021 · 26 Aug · Shift 2

The value of

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(\frac{1 + \sin^2 x}{1 + \pi^{\sin x}} \right) dx$$

is

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

[Step-by-step solution ► prepwiser.in/questions/dfQIMBtdSp](https://www.prepwiser.in/questions/dfQIMBtdSp)

Q92 JEE Main 2021 · 26 Aug · Shift 1

The value of

$$\int_{\frac{-1}{\sqrt{2}}}^{\frac{1}{\sqrt{2}}} \left(\left(\frac{x+1}{x-1} \right)^2 + \left(\frac{x-1}{x+1} \right)^2 - 2 \right)^{\frac{1}{2}} dx$$

is :

- (A) $\log_e 4$
(B) $\log_e 16$
(C) $2\log_e 16$
(D) $4\log_e (3 + 2\sqrt{2})$

[Step-by-step solution ► prepwiser.in/questions/1cqN3AYvHF](https://www.prepwiser.in/questions/1cqN3AYvHF)

Q93 JEE Main 2021 · 27 Jul · Shift 2

If

$$\int_0^\pi (\sin^3 x) e^{-\sin^2 x} dx = \alpha - \frac{\beta}{e} \int_0^1 \sqrt{t} e^t dt$$

, then $\alpha + \beta$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/vKfohzwrJJ](https://www.prepwiser.in/questions/vKfohzwrJJ)

Q94 JEE Main 2021 · 27 Jul · Shift 1

Let the domain of the function

$$f(x) = \log_4 (\log_5 (\log_3 (18x - x^2 - 77)))$$

be (a, b). Then the value of the integral

$$\int_a^b \frac{\sin^3 x}{(\sin^3 x + \sin^3(a+b-x))} dx$$

is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/n9VNlQkURH](https://www.prepwiser.in/questions/n9VNlQkURH)

Q95 JEE Main 2021 · 27 Jul · Shift 1

The value of the definite integral

$$\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \frac{dx}{(1 + e^{x \cos x})(\sin^4 x + \cos^4 x)}$$

is equal to :

(A) $-\frac{\pi}{2}$

(B) $\frac{\pi}{2\sqrt{2}}$

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

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

[Step-by-step solution ► prepwiser.in/questions/o01iuZmO1x](https://www.prepwiser.in/questions/o01iuZmO1x)

Q96 JEE Main 2021 · 25 Jul · Shift 2

The value of the

integral $\int_{-1}^1 \log(x + \sqrt{x^2 + 1}) dx$ is :

(A) 2

(B) 0

(C) -1

(D) 1

[Step-by-step solution ► prepwiser.in/questions/aPPPKNJULF](https://www.prepwiser.in/questions/aPPPKNJULF)

Q97 JEE Main 2021 · 25 Jul · Shift 1

The value of the definite integral $\int_{\pi/24}^{5\pi/24} \frac{dx}{1 + \sqrt[3]{\tan 2x}}$ is :

(A) $\frac{\pi}{3}$

(B) $\frac{\pi}{6}$

(C) $\frac{\pi}{12}$

(D) $\frac{\pi}{18}$

[Step-by-step solution ► prepwiser.in/questions/HouWF0dZ2V](https://www.prepwiser.in/questions/HouWF0dZ2V)

If

$$\int_0^{100\pi} \frac{\sin^2 x}{e^{\left(\frac{x}{\pi} - \left[\frac{x}{\pi}\right]\right)}} dx = \frac{\alpha\pi^3}{1 + 4\pi^2}, \alpha \in R$$

where $[x]$ is the greatest integer less than or equal to x , then the value of α is :

- (A) $200(1 - e^{-1})$
- (B) $100(1 - e)$
- (C) $50(e - 1)$
- (D) $150(e^{-1} - 1)$

[Step-by-step solution ► prepwisar.in/questions/KfQQNS3YLj](https://www.prepwisar.in/questions/KfQQNS3YLj)

The value of the integral $\int_{-1}^1 \log_e(\sqrt{1-x} + \sqrt{1+x}) dx$ is equal to:

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

[Step-by-step solution ► prepwisar.in/questions/7BI06zmeu](https://www.prepwisar.in/questions/7BI06zmeu)

If $[x]$ denotes the greatest integer less than or equal to x , then the value of the integral

$\int_{-\pi/2}^{\pi/2} [[x] - \sin x] dx$ is equal to :

- (A) $-\pi$
- (B) π
- (C) 0
- (D) 1

[Step-by-step solution ► prepwisar.in/questions/GObIrFjv8S](https://www.prepwisar.in/questions/GObIrFjv8S)

Let

$$g(t) = \int_{-\pi/2}^{\pi/2} \cos\left(\frac{\pi}{4}t + f(x)\right) dx$$

, where $f(x) = \log_e(x + \sqrt{x^2 + 1})$, $x \in R$. Then which one of the following is correct?

- (A) $g(1) = g(0)$
- (B) $\sqrt{2}g(1) = g(0)$
- (C) $g(1) = \sqrt{2}g(0)$
- (D) $g(1) + g(0) = 0$

[Step-by-step solution ► prepwisar.in/questions/ZN5rmVCdp1](https://www.prepwisar.in/questions/ZN5rmVCdp1)

Q102 JEE Main 2021 · 20 Jul · Shift 1

Let a be a positive real number such that $\int_0^a e^{x-[x]} dx = 10e - 9$ where $[x]$ is the greatest integer less than or equal to x . Then a is equal to:

- (A) $10 - \log_e(1 + e)$ (B) $10 + \log_e 2$
(C) $10 + \log_e 3$ (D) $10 + \log_e(1 + e)$

[Step-by-step solution ► prepwisser.in/questions/bR6joK-nvj](https://www.prepwisser.in/questions/bR6joK-nvj)

Q103 JEE Main 2021 · 18 Mar · Shift 1

Let $f(x)$ and $g(x)$ be two functions satisfying $f(x^2) + g(4 - x) = 4x^3$ and $g(4 - x) + g(x) = 0$, then the value of $\int_{-4}^4 f(x)^2 dx$ is

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/Us4J_4eIEi](https://www.prepwisser.in/questions/Us4J_4eIEi)

Q104 JEE Main 2021 · 18 Mar · Shift 2

Let $g(x) = \int_0^x f(t) dt$, where f is continuous function in $[0, 3]$ such that $\frac{1}{3} \leq f(t) \leq 1$ for all $t \in [0, 1]$ and $0 \leq f(t) \leq \frac{1}{2}$ for all $t \in (1, 3]$. The largest possible interval in which $g(3)$ lies is :

- (A) $[-1, -\frac{1}{2}]$ (B) $[-\frac{3}{2}, -1]$
(C) $[1, 3]$ (D) $[\frac{1}{3}, 2]$

[Step-by-step solution ► prepwisser.in/questions/10ti_ym-Vs](https://www.prepwisser.in/questions/10ti_ym-Vs)

Q105 JEE Main 2021 · 17 Mar · Shift 1

Which of the following statements is correct for the function $g(\alpha)$ for $\alpha \in \mathbb{R}$ such that

$$g(\alpha) = \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin^\alpha x}{\cos^\alpha x + \sin^\alpha x} dx$$

- (A) $g(\alpha)$ is a strictly increasing function
(B) $g(\alpha)$ is an even function
(C) $g(\alpha)$ has an inflection point at $\alpha = -\frac{1}{2}$
(D) $g(\alpha)$ is a strictly decreasing function

[Step-by-step solution ► prepwisser.in/questions/OAtF4VNMjo](https://www.prepwisser.in/questions/OAtF4VNMjo)

If the integral

$$\int_0^{10} \frac{[\sin 2\pi x]}{e^{x-[x]}} dx = \alpha e^{-1} + \beta e^{-\frac{1}{2}} + \gamma$$

, where α, β, γ are integers and $[x]$ denotes the greatest integer less than or equal to x , then the value of $\alpha + \beta + \gamma$ is equal to :

- (A) 0 (B) 10
(C) 20 (D) 25

Step-by-step solution ► [prepwisar.in/questions/LImeRaen7t](https://www.prepwisar.in/questions/LImeRaen7t)

Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a continuous function such that $f(x) + f(x+1) = 2$, for all $x \in \mathbb{R}$.

If $I_1 = \int_0^8 f(x) dx$ and $I_2 = \int_{-1}^3 f(x) dx$, then the value of $I_1 + 2I_2$ is equal to _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwisar.in/questions/UeYzdCoFjz](https://www.prepwisar.in/questions/UeYzdCoFjz)

Let $P(x) = x^2 + bx + c$ be a quadratic polynomial with real coefficients such that $\int_0^1 P(x) dx = 1$ and $P(x)$ leaves remainder 5 when it is divided by $(x-2)$. Then the value of $9(b+c)$ is equal to :

- (A) 9 (B) 11
(C) 7 (D) 15

Step-by-step solution ► [prepwisar.in/questions/sGA_WaPOe](https://www.prepwisar.in/questions/sGA_WaPOe)

Consider the integral

$$I = \int_0^{10} \frac{[x]e^{[x]}}{e^{x-1}} dx,$$

where $[x]$ denotes the greatest integer less than or equal to x . Then the value of I is equal to :

- (A) $45(e-1)$ (B) $45(e+1)$
(C) $9(e+1)$ (D) $9(e-1)$

Step-by-step solution ► [prepwisar.in/questions/SglKe4x-a0](https://www.prepwisar.in/questions/SglKe4x-a0)

The value of $\int_{-\pi/2}^{\pi/2} \frac{\cos^2 x}{1+3^x} dx$ is :

- (A) 2π (B) $\frac{\pi}{2}$
(C) 4π (D) $\frac{\pi}{4}$

Step-by-step solution ► [prepwisar.in/questions/_7kb5ZQHlj](https://www.prepwisar.in/questions/_7kb5ZQHlj)

Q111 JEE Main 2021 · 26 Feb · Shift 1

The value of $\sum_{n=1}^{100} \int_{n-1}^n e^{x-[x]} dx$, where $[x]$ is the greatest integer $\leq x$, is :

- (A) $100e$ (B) $100(e - 1)$
(C) $100(1 + e)$ (D) $100(1 - e)$

Step-by-step solution ► [prepwisser.in/questions/e2S8Mosq_5](https://www.prepwisser.in/questions/e2S8Mosq_5)

Q112 JEE Main 2021 · 26 Feb · Shift 2

For $x > 0$, if $f(x) = \int_1^x \frac{\log_e t}{(1+t)} dt$, then $f(e) + f\left(\frac{1}{e}\right)$ is equal to :

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

Step-by-step solution ► [prepwisser.in/questions/TIsnJe_Uef](https://www.prepwisser.in/questions/TIsnJe_Uef)

Q113 JEE Main 2021 · 26 Feb · Shift 1

The value of the integral $\int_0^{\pi} |\sin 2x| dx$ is _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwisser.in/questions/6gDGcdTuV5](https://www.prepwisser.in/questions/6gDGcdTuV5)

Q114 JEE Main 2021 · 26 Feb · Shift 2

If $I_{m,n} = \int_0^1 x^{m-1}(1-x)^{n-1} dx$, for $m, n \geq 1$, and

$$\int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+1}} dx = \alpha I_{m,n} \alpha \in R$$

, then α equals _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwisser.in/questions/n4IbdIXwbX](https://www.prepwisser.in/questions/n4IbdIXwbX)

Q115 JEE Main 2021 · 25 Feb · Shift 2

If $I_n = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cot^n x dx$, then :

- (A) $\frac{1}{I_2+I_4}, \frac{1}{I_3+I_5}, \frac{1}{I_4+I_6}$ are in A.P.
(B) $I_2 + I_4, I_3 + I_5, I_4 + I_6$ are in A.P.
(C) $\frac{1}{I_2+I_4}, \frac{1}{I_3+I_5}, \frac{1}{I_4+I_6}$ are in G.P.
(D) $I_2 + I_4, (I_3 + I_5)^2, I_4 + I_6$ are in G.P.

Step-by-step solution ► [prepwisser.in/questions/9Bx2HI-xSx](https://www.prepwisser.in/questions/9Bx2HI-xSx)

Q116 JEE Main 2021 · 25 Feb · Shift 1

The value of $\int_{-1}^1 x^2 e^{[x^3]} dx$, where $[t]$ denotes the greatest integer $\leq t$, is :

- (A) $\frac{e+1}{3}$ (B) $\frac{e-1}{3e}$
(C) $\frac{1}{3e}$ (D) $\frac{e+1}{3e}$

[Step-by-step solution](https://www.prepwisar.in/questions/cpfFbBlwsm) ▶ [prepwisar.in/questions/cpfFbBlwsm](https://www.prepwisar.in/questions/cpfFbBlwsm)

Q117 JEE Main 2021 · 24 Feb · Shift 1

If

$$\int_{-a}^a (|x| + |x - 2|) dx = 22$$

, ($a > 2$) and $[x]$ denotes the greatest integer $\leq x$, then $\int_{-a}^a (x + [x]) dx$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution](https://www.prepwisar.in/questions/hmP8e9bga1) ▶ [prepwisar.in/questions/hmP8e9bga1](https://www.prepwisar.in/questions/hmP8e9bga1)

Q118 JEE Main 2021 · 24 Feb · Shift 2

Let $f(x)$ be a differentiable function defined on $[0, 2]$ such that $f'(x) = f'(2 - x)$ for all $x \in (0, 2)$, $f(0) = 1$ and $f(2) = e^2$. Then the value of $\int_0^2 f(x) dx$ is :

- (A) $1 + e^2$
(B) $2(1 + e^2)$
(C) $1 - e^2$
(D) $2(1 - e^2)$

[Step-by-step solution](https://www.prepwisar.in/questions/uiBLIjFY9) ▶ [prepwisar.in/questions/uiBLIjFY9](https://www.prepwisar.in/questions/uiBLIjFY9)

Q119 JEE Main 2021 · 24 Feb · Shift 2

The value of the integral, $\int_1^3 [x^2 - 2x - 2] dx$, where $[x]$ denotes the greatest integer less than or equal to x , is :

- (A) -5 (B) $-\sqrt{2} - \sqrt{3} + 1$
(C) -4 (D) $-\sqrt{2} - \sqrt{3} - 1$

[Step-by-step solution](https://www.prepwisar.in/questions/MPI7GvBt57) ▶ [prepwisar.in/questions/MPI7GvBt57](https://www.prepwisar.in/questions/MPI7GvBt57)

Q120 JEE Main 2020 · 6 Sep · Shift 1

If $I_1 = \int_0^1 (1 - x^{50})^{100} dx$ and

$I_2 = \int_0^1 (1 - x^{50})^{101} dx$ such

that $I_2 = \alpha I_1$ then α equals to :

- (A) $\frac{5051}{5050}$ (B) $\frac{5050}{5051}$
(C) $\frac{5050}{5049}$ (D) $\frac{5049}{5050}$

[Step-by-step solution](https://www.prepwisar.in/questions/hjUaVwI4DA) ▶ [prepwisar.in/questions/hjUaVwI4DA](https://www.prepwisar.in/questions/hjUaVwI4DA)

Q121 JEE Main 2020 · 5 Sep · Shift 1

The value of

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{1}{1 + e^{\sin x}} dx$$

is:

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

[Step-by-step solution ► prepwiser.in/questions/rYaFjF-o6C](https://www.prepwiser.in/questions/rYaFjF-o6C)

Q122 JEE Main 2020 · 4 Sep · Shift 2

The integral

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \tan^3 x \cdot \sin^2 3x (2 \sec^2 x \cdot \sin^2 3x + 3 \tan x \cdot \sin 6x) dx$$

is equal to:

- (A) $-\frac{1}{9}$ (B) $-\frac{1}{18}$
(C) $\frac{7}{18}$ (D) $\frac{9}{2}$

[Step-by-step solution ► prepwiser.in/questions/3Xp-EpnCPX](https://www.prepwiser.in/questions/3Xp-EpnCPX)

Q123 JEE Main 2020 · 4 Sep · Shift 2

Let $\{x\}$ and $[x]$ denote the fractional part of x and the greatest integer $\leq x$ respectively of a real number x . If $\int_0^n \{x\} dx$, $\int_0^n [x] dx$ and $10(n^2 - n)$, ($n \in \mathbb{N}$, $n > 1$) are three consecutive terms of a G.P., then n is equal to ____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/LAIorjYFLJ](https://www.prepwiser.in/questions/LAIorjYFLJ)

Q124 JEE Main 2020 · 4 Sep · Shift 1

Let $f(x) = |x - 2|$ and $g(x) = f(f(x))$, $x \in [0, 4]$. Then

$\int_0^3 (g(x) - f(x)) dx$ is equal to:

- (A) 1 (B) 0
(C) $\frac{1}{2}$ (D) $\frac{3}{2}$

[Step-by-step solution ► prepwiser.in/questions/sqwo7jqesJ](https://www.prepwiser.in/questions/sqwo7jqesJ)

Q125 JEE Main 2020 · 3 Sep · Shift 2

If the value of the integral

$$\int_0^{\frac{1}{2}} \frac{x^2}{(1-x^2)^{\frac{3}{2}}} dx$$

is $\frac{k}{6}$, then k is equal to :

(A) $2\sqrt{3} + \pi$

(B) $3\sqrt{2} - \pi$

(C) $3\sqrt{2} + \pi$

(D) $2\sqrt{3} - \pi$

[Step-by-step solution ► prepwisser.in/questions/MZnsBmyOYD](https://www.prepwisser.in/questions/MZnsBmyOYD)

Q126 JEE Main 2020 · 3 Sep · Shift 1

$\int_{-\pi}^{\pi} |\pi - |x|| dx$ is equal to :

(A) π^2

(B) $2\pi^2$

(C) $\sqrt{2}\pi^2$

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

[Step-by-step solution ► prepwisser.in/questions/Hpk5PM9oEf](https://www.prepwisser.in/questions/Hpk5PM9oEf)

Q127 JEE Main 2020 · 2 Sep · Shift 1

The integral $\int_0^2 ||x - 1| - x| dx$
is equal to ____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/U7nF8ZStXe](https://www.prepwisser.in/questions/U7nF8ZStXe)

Q128 JEE Main 2020 · 2 Sep · Shift 2

Let $[t]$ denote the greatest integer less than or equal to t .

Then the value of $\int_1^2 |2x - [3x]| dx$ is ____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/yYiCJsN_2o](https://www.prepwisser.in/questions/yYiCJsN_2o)

Q129 JEE Main 2020 · 9 Jan · Shift 1

The value of

$\int_0^{2\pi} \frac{x \sin^8 x}{\sin^8 x + \cos^8 x} dx$ is equal to :

(A) 4π

(B) 2π

(C) π^2

(D) $2\pi^2$

[Step-by-step solution ► prepwisser.in/questions/EPdsylEbbr](https://www.prepwisser.in/questions/EPdsylEbbr)

Q130 JEE Main 2020 · 9 Jan · Shift 1

If for all real triplets (a, b, c) , $f(x) = a + bx + cx^2$; then $\int_0^1 f(x)dx$ is equal to :

- (A) $\frac{1}{6} \{f(0) + f(1) + 4f(\frac{1}{2})\}$
(B) $2 \{3f(1) + 2f(\frac{1}{2})\}$
(C) $\frac{1}{3} \{f(0) + f(\frac{1}{2})\}$
(D) $\frac{1}{2} \{f(1) + 3f(\frac{1}{2})\}$

[Step-by-step solution ► prepwisser.in/questions/07hYffNly8](https://www.prepwisser.in/questions/07hYffNly8)

Q131 JEE Main 2020 · 7 Jan · Shift 2

The value of α for which

$$4\alpha \int_{-1}^2 e^{-\alpha|x|} dx = 5, \text{ is:}$$

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

[Step-by-step solution ► prepwisser.in/questions/mXSvxY9jy5](https://www.prepwisser.in/questions/mXSvxY9jy5)

Q132 JEE Main 2020 · 7 Jan · Shift 1

If $f(a + b + 1 - x) = f(x)$, for all x , where a and b are fixed positive real numbers, then

$\frac{1}{a+b} \int_a^b x(f(x) + f(x+1))dx$ is equal to:

- (A) $\int_{a-1}^{b-1} f(x+1)dx$ (B) $\int_{a+1}^{b+1} f(x+1)dx$
(C) $\int_{a-1}^{b-1} f(x)dx$ (D) $\int_{a+1}^{b+1} f(x)dx$

[Step-by-step solution ► prepwisser.in/questions/Vb8FgYjp_K](https://www.prepwisser.in/questions/Vb8FgYjp_K)

Fundamental Theorem of Calculus · 18 PYQs

Q133 JEE Main 2025 · 2 Apr · Shift 2

Let $f : [1, \infty) \rightarrow [2, \infty)$ be a differentiable function. If $10 \int_1^x f(t)dt = 5xf(x) - x^5 - 9$ for all $x \geq 1$, then the value of $f(3)$ is :

- (A) 22 (B) 26
(C) 32 (D) 18

[Step-by-step solution ► prepwisser.in/questions/tTcH4K_ER-](https://www.prepwisser.in/questions/tTcH4K_ER-)

Q134 JEE Main 2025 · 29 Jan · Shift 1

Let $f : (0, \infty) \rightarrow \mathbf{R}$ be a twice differentiable function. If for some $a \neq 0$, $\int_0^1 f(\lambda x)d\lambda = af(x)$, $f(1) = 1$ and $f(16) = \frac{1}{8}$, then $16 - f'(\frac{1}{16})$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/pxyav6aPhq](https://www.prepwisser.in/questions/pxyav6aPhq)

Q135 JEE Main 2025 · 28 Jan · Shift 1

Let for some function $y = f(x)$, $\int_0^x t f(t) dt = x^2 f(x)$, $x > 0$ and $f(2) = 3$. Then $f(6)$ is equal to

- (A) 1 (B) 6
(C) 2 (D) 3

[Step-by-step solution ► prepwiser.in/questions/HUmq48yiai](https://www.prepwiser.in/questions/HUmq48yiai)

Q136 JEE Main 2024 · 8 Apr · Shift 2

Let

$$\int_{\alpha}^{\log_e 4} \frac{dx}{\sqrt{e^x - 1}} = \frac{\pi}{6}$$

. Then e^{α} and $e^{-\alpha}$ are the roots of the equation :

- (A) $2x^2 - 5x + 2 = 0$ (B) $x^2 - 2x - 8 = 0$
(C) $2x^2 - 5x - 2 = 0$ (D) $x^2 + 2x - 8 = 0$

[Step-by-step solution ► prepwiser.in/questions/9lFO0UW4Ls](https://www.prepwiser.in/questions/9lFO0UW4Ls)

Q137 JEE Main 2024 · 1 Feb · Shift 2

Let $f : (0, \infty) \rightarrow \mathbf{R}$ and $F(x) = \int_0^x t f(t) dt$. If $F(x^2) = x^4 + x^5$, then $\sum_{r=1}^{12} f(r^2)$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/o4vOzbmmG6](https://www.prepwiser.in/questions/o4vOzbmmG6)

Q138 JEE Main 2024 · 30 Jan · Shift 2

Let $f : \mathbf{R} \rightarrow \mathbf{R}$ be defined as $f(x) = ae^{2x} + be^x + cx$. If $f(0) = -1$, $f'(\log_e 2) = 21$ and $\int_0^{\log_e 4} (f(x) - cx) dx = \frac{39}{2}$, then the value of $|a + b + c|$ equals

- (A) 16 (B) 12
(C) 8 (D) 10

[Step-by-step solution ► prepwiser.in/questions/z5M2od9efj](https://www.prepwiser.in/questions/z5M2od9efj)

Q139 JEE Main 2024 · 30 Jan · Shift 2

Let $f : \mathbf{R} \rightarrow \mathbf{R}$ be a function defined by $f(x) = \frac{x}{(1+x^4)^{1/4}}$, and $g(x) = f(f(f(f(x))))$. Then, $18 \int_0^{\sqrt{2\sqrt{5}}} x^2 g(x) dx$ is equal to

- (A) 36 (B) 33
(C) 39 (D) 42

[Step-by-step solution ► prepwiser.in/questions/Z6yqwHefQm](https://www.prepwiser.in/questions/Z6yqwHefQm)

Q140 JEE Main 2024 · 27 Jan · Shift 1

If $\int_0^1 \frac{1}{\sqrt{3+x} + \sqrt{1+x}} dx = a + b\sqrt{2} + c\sqrt{3}$, where a, b, c are rational numbers, then $2a + 3b - 4c$ is equal to :

- (A) 10 (B) 7
(C) 4 (D) 8

[Step-by-step solution ► prepwiser.in/questions/-nLGk2q-Lh](https://www.prepwiser.in/questions/-nLGk2q-Lh)

Q141 JEE Main 2023 · 10 Apr · Shift 2

Let f be a continuous function satisfying

$$\int_0^{t^2} (f(x) + x^2) dx = \frac{4}{3}t^3, \forall t > 0$$

. Then $f\left(\frac{\pi^2}{4}\right)$ is equal to :

- (A) $-\pi\left(1 + \frac{\pi^3}{16}\right)$
- (B) $\pi\left(1 - \frac{\pi^3}{16}\right)$
- (C) $-\pi^2\left(1 + \frac{\pi^2}{16}\right)$
- (D) $\pi^2\left(1 - \frac{\pi^2}{16}\right)$

[Step-by-step solution ► prepwisar.in/questions/0B1HMhXTdi](https://www.prepwisar.in/questions/0B1HMhXTdi)

Q142 JEE Main 2023 · 31 Jan · Shift 1

The value of

$$\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \frac{(2 + 3 \sin x)}{\sin x(1 + \cos x)} dx$$

is equal to :

- (A) $\frac{10}{3} - \sqrt{3} + \log_e \sqrt{3}$
- (B) $\frac{7}{2} - \sqrt{3} - \log_e \sqrt{3}$
- (C) $\frac{10}{3} - \sqrt{3} - \log_e \sqrt{3}$
- (D) $-2 + 3\sqrt{3} + \log_e \sqrt{3}$

[Step-by-step solution ► prepwisar.in/questions/2kkTJqWsmL](https://www.prepwisar.in/questions/2kkTJqWsmL)

Q143 JEE Main 2023 · 31 Jan · Shift 2

Let $\alpha > 0$. If $\int_0^\alpha \frac{x}{\sqrt{x+\alpha}-\sqrt{x}} dx = \frac{16+20\sqrt{2}}{15}$, then α is equal to :

- (A) 4
- (B) 2
- (C) $2\sqrt{2}$
- (D) $\sqrt{2}$

[Step-by-step solution ► prepwisar.in/questions/eICUBsI9Zt](https://www.prepwisar.in/questions/eICUBsI9Zt)

Q144 JEE Main 2023 · 30 Jan · Shift 1

If $[t]$ denotes the greatest integer $\leq t$, then the value of $\frac{3(e-1)}{e} \int_1^2 x^2 e^{[x]+[x^3]} dx$ is :

- (A) $e^8 - e$
- (B) $e^7 - 1$
- (C) $e^9 - e$
- (D) $e^8 - 1$

[Step-by-step solution ► prepwisar.in/questions/sATQtEFy1I](https://www.prepwisar.in/questions/sATQtEFy1I)

$$\int_{\frac{3\sqrt{2}}{4}}^{\frac{3\sqrt{3}}{4}} \frac{48}{\sqrt{9-4x^2}} dx$$

is equal to :

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

[Step-by-step solution ► prepwiser.in/questions/zTeVbPL5](https://www.prepwiser.in/questions/zTeVbPL5)

If

$$\int_0^{\sqrt{3}} \frac{15x^3}{\sqrt{1+x^2} + \sqrt{(1+x^2)^3}} dx = \alpha\sqrt{2} + \beta\sqrt{3}$$

, where α, β are integers, then $\alpha + \beta$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/CispHPs6kN](https://www.prepwiser.in/questions/CispHPs6kN)

Let

$$a_n = \int_{-1}^n \left(1 + \frac{x}{2} + \frac{x^2}{3} + \dots + \frac{x^{n-1}}{n} \right) dx$$

for every $n \in \mathbb{N}$. Then the sum of all the elements of the set $\{n \in \mathbb{N} : a_n \in (2, 30)\}$ is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/GUYo-Phytv](https://www.prepwiser.in/questions/GUYo-Phytv)

The value of $b > 3$ for which

$$12 \int_3^b \frac{1}{(x^2-1)(x^2-4)} dx = \log_e \left(\frac{49}{40} \right)$$

, is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/ePI9f1zoOP](https://www.prepwiser.in/questions/ePI9f1zoOP)

Q149 JEE Main 2021 · 17 Mar · Shift 2

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined as $f(x) = e^{-x} \sin x$. If $F: [0, 1] \rightarrow \mathbb{R}$ is a differentiable function with that $F(x) = \int_0^x f(t) dt$, then the value of $\int_0^1 (F'(x) + f(x))e^x dx$ lies in the interval

- (A) $\left[\frac{331}{360}, \frac{334}{360}\right]$
- (B) $\left[\frac{330}{360}, \frac{331}{360}\right]$
- (C) $\left[\frac{335}{360}, \frac{336}{360}\right]$
- (D) $\left[\frac{327}{360}, \frac{329}{360}\right]$

[Step-by-step solution ► prepwiser.in/questions/aTdO8hksmc](https://www.prepwiser.in/questions/aTdO8hksmc)

Q150 JEE Main 2020 · 6 Sep · Shift 2

The integral $\int_1^2 e^x \cdot x^x (2 + \log_e x) dx$ equals :

- (A) $e(4e + 1)$
- (B) $e(2e - 1)$
- (C) $e(4e - 1)$
- (D) $4e^2 - 1$

[Step-by-step solution ► prepwiser.in/questions/HxckiFdTuN](https://www.prepwiser.in/questions/HxckiFdTuN)

Leibniz Rule · 6 PYQs

Q151 JEE Main 2025 · 28 Jan · Shift 2

Let f be a real valued continuous function defined on the positive real axis such that $g(x) = \int_0^x t f(t) dt$. If

$g(x^3) = x^6 + x^7$, then value of $\sum_{r=1}^{15} f(r^3)$ is :

- (A) 270
- (B) 340
- (C) 310
- (D) 320

[Step-by-step solution ► prepwiser.in/questions/dhRkG8SCTL](https://www.prepwiser.in/questions/dhRkG8SCTL)

Q152 JEE Main 2023 · 31 Jan · Shift 2

If $\phi(x) = \frac{1}{\sqrt{x}} \int_{\frac{\pi}{4}}^x (4\sqrt{2} \sin t - 3\phi'(t)) dt, x > 0$,

then $\phi'\left(\frac{\pi}{4}\right)$ is equal to :

- (A) $\frac{4}{6+\sqrt{\pi}}$
- (B) $\frac{4}{6-\sqrt{\pi}}$
- (C) $\frac{8}{\sqrt{\pi}}$
- (D) $\frac{8}{6+\sqrt{\pi}}$

[Step-by-step solution ► prepwiser.in/questions/AoNiQIDgEQ](https://www.prepwiser.in/questions/AoNiQIDgEQ)

Q153 JEE Main 2023 · 31 Jan · Shift 1

Let a differentiable function f satisfy $f(x) + \int_3^x \frac{f(t)}{t} dt = \sqrt{x+1}$, $x \geq 3$. Then $12f(8)$ is equal to :

- (A) 19 (B) 34
(C) 17 (D) 1

[Step-by-step solution ► prepwiser.in/questions/r9yq_J4qX6](https://www.prepwiser.in/questions/r9yq_J4qX6)

Q154 JEE Main 2022 · 25 Jul · Shift 2

Let f be a twice differentiable function on $\mathbb{R}$. If $f'(0) = 4$ and

$$f(x) + \int_0^x (x-t)f'(t)dt = (e^{2x} + e^{-2x}) \cos 2x + \frac{2}{a}x$$

, then $(2a+1)^5 a^2$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/F3k_TBolEz](https://www.prepwiser.in/questions/F3k_TBolEz)

Q155 JEE Main 2021 · 27 Jul · Shift 1

Let $F : [3, 5] \rightarrow \mathbb{R}$ be a twice differentiable function on $(3, 5)$ such that

$F(x) = e^{-x} \int_3^x (3t^2 + 2t + 4F'(t))dt$. If $F'(4) = \frac{\alpha e^\beta - 224}{(e^\beta - 4)^2}$, then $\alpha + \beta$ is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/IWsw2-syDb](https://www.prepwiser.in/questions/IWsw2-syDb)

Q156 JEE Main 2021 · 26 Feb · Shift 2

Let $f(x) = \int_0^x e^t f(t)dt + e^x$ be a differentiable function for all $x \in \mathbb{R}$. Then $f(x)$ equals :

- (A) $e^{(e^x-1)}$ (B) $2e^{e^x} - 1$
(C) $2e^{e^x-1} - 1$ (D) $e^{e^x} - 1$

[Step-by-step solution ► prepwiser.in/questions/x_oh3z7UEY](https://www.prepwiser.in/questions/x_oh3z7UEY)

Definite Integral as Limit of Sum · 14 PYQs

Q157 JEE Main 2024 · 30 Jan · Shift 1

The value of

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{n^3}{(n^2 + k^2)(n^2 + 3k^2)}$$

is :

- (A) $\frac{\pi}{8(2\sqrt{3}+3)}$ (B) $\frac{(2\sqrt{3}+3)\pi}{24}$
(C) $\frac{13\pi}{8(4\sqrt{3}+3)}$ (D) $\frac{13(2\sqrt{3}-3)\pi}{8}$

[Step-by-step solution ► prepwiser.in/questions/hTeND7ncsc](https://www.prepwiser.in/questions/hTeND7ncsc)

Q158 JEE Main 2024 · 30 Jan · Shift 1

The value of $9 \int_0^9 \left[\sqrt{\frac{10x}{x+1}} \right] dx$, where $[t]$ denotes the greatest integer less than or equal to t , is

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/ATxwIoNftu](https://www.prepwisser.in/questions/ATxwIoNftu)

Q159 JEE Main 2023 · 13 Apr · Shift 1

Among

(S1): $\lim_{n \rightarrow \infty} \frac{1}{n^2} (2 + 4 + 6 + \dots + 2n) = 1$

(S2):

$$\lim_{n \rightarrow \infty} \frac{1}{n^{16}} (1^{15} + 2^{15} + 3^{15} + \dots + n^{15}) = \frac{1}{16}$$

(A) Only (S1) is true

(B) Both (S1) and (S2) are true

(C) Both (S1) and (S2) are false

(D) Only (S2) is true

[Step-by-step solution ► prepwisser.in/questions/OBuCbZQIBK](https://www.prepwisser.in/questions/OBuCbZQIBK)

Q160 JEE Main 2023 · 1 Feb · Shift 1

$$\lim_{n \rightarrow \infty} \left[\frac{1}{1+n} + \frac{1}{2+n} + \frac{1}{3+n} + \dots + \frac{1}{2n} \right]$$

is equal to

(A) 0

(B) $\log_e 2$

(C) $\log_e \left(\frac{2}{3} \right)$

(D) $\log_e \left(\frac{3}{2} \right)$

[Step-by-step solution ► prepwisser.in/questions/p5wWApWgxK](https://www.prepwisser.in/questions/p5wWApWgxK)

Q161 JEE Main 2023 · 30 Jan · Shift 2

$\lim_{n \rightarrow \infty} \frac{3}{n} \left\{ 4 + \left(2 + \frac{1}{n} \right)^2 + \left(2 + \frac{2}{n} \right)^2 + \dots + \left(3 - \frac{1}{n} \right)^2 \right\}$ is equal to :

(A) 0

(B) $\frac{19}{3}$

(C) 19

(D) 12

[Step-by-step solution ► prepwisser.in/questions/Vs4RpDCgyI](https://www.prepwisser.in/questions/Vs4RpDCgyI)

Q162 JEE Main 2022 · 26 Jul · Shift 1

If

$$a = \lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{2n}{n^2 + k^2}$$

and $f(x) = \sqrt{\frac{1-\cos x}{1+\cos x}}$, $x \in (0, 1)$, then :

(A) $2\sqrt{2}f\left(\frac{a}{2}\right) = f'\left(\frac{a}{2}\right)$

(B) $f\left(\frac{a}{2}\right) f'\left(\frac{a}{2}\right) = \sqrt{2}$

(C) $\sqrt{2}f\left(\frac{a}{2}\right) = f'\left(\frac{a}{2}\right)$

(D) $f\left(\frac{a}{2}\right) = \sqrt{2}f'\left(\frac{a}{2}\right)$

[Step-by-step solution ► prepwisser.in/questions/oo0s7xXNmX](https://www.prepwisser.in/questions/oo0s7xXNmX)

$$\text{If } \lim_{n \rightarrow \infty} \frac{(n+1)^{k-1}}{n^{k+1}} [(nk+1) + (nk+2) + \dots + (nk+n)]$$

$$= 33 \cdot \lim_{n \rightarrow \infty} \frac{1}{n^{k+1}} \cdot [1^k + 2^k + 3^k + \dots + n^k]$$

, then the integral value of k is equal to _____

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/LleW15oicr](https://www.prepwiser.in/questions/LleW15oicr)

$$\lim_{n \rightarrow \infty} \frac{1}{2^n} \left(\frac{1}{\sqrt{1 - \frac{1}{2^n}}} + \frac{1}{\sqrt{1 - \frac{2}{2^n}}} + \frac{1}{\sqrt{1 - \frac{3}{2^n}}} + \dots + \frac{1}{\sqrt{1 - \frac{2^n-1}{2^n}}} \right)$$

is equal to

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

[Step-by-step solution ► prepwiser.in/questions/mIhGhf2vOw](https://www.prepwiser.in/questions/mIhGhf2vOw)

$$\lim_{n \rightarrow \infty} \sum_{r=1}^n \frac{r}{2r^2 - 7rn + 6n^2}$$

is equal to :

- (A) $\log_e \left(\frac{\sqrt{3}}{2} \right)$
(B) $\log_e \left(\frac{3\sqrt{3}}{4} \right)$
(C) $\log_e \left(\frac{27}{4} \right)$
(D) $\log_e \left(\frac{4}{3} \right)$

[Step-by-step solution ► prepwiser.in/questions/Kt5Bdttp6j](https://www.prepwiser.in/questions/Kt5Bdttp6j)

$$\lim_{n \rightarrow \infty} \left(\frac{n^2}{(n^2+1)(n+1)} + \frac{n^2}{(n^2+4)(n+2)} + \frac{n^2}{(n^2+9)(n+3)} + \dots + \frac{n^2}{(n^2+n^2)(n+n)} \right)$$

is equal to :

- (A) $\frac{\pi}{8} + \frac{1}{4} \log_e 2$ (B) $\frac{\pi}{4} + \frac{1}{8} \log_e 2$
(C) $\frac{\pi}{4} - \frac{1}{8} \log_e 2$ (D) $\frac{\pi}{8} + \log_e \sqrt{2}$

[Step-by-step solution ► prepwiser.in/questions/hgf5s65A9H](https://www.prepwiser.in/questions/hgf5s65A9H)

The value of

$$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{r=0}^{2n-1} \frac{n^2}{n^2 + 4r^2}$$

is :

(A) $\frac{1}{2} \tan^{-1}(2)$

(B) $\frac{1}{2} \tan^{-1}(4)$

(C) $\tan^{-1}(4)$

(D) $\frac{1}{4} \tan^{-1}(4)$

[Step-by-step solution ► prepwiser.in/questions/sGzvNpEfQP](https://www.prepwiser.in/questions/sGzvNpEfQP)

The value of

$$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{j=1}^n \frac{(2j-1) + 8n}{(2j-1) + 4n}$$

is equal to :

(A) $5 + \log_e \left(\frac{3}{2}\right)$

(B) $2 - \log_e \left(\frac{2}{3}\right)$

(C) $3 + 2\log_e \left(\frac{2}{3}\right)$

(D) $1 + 2\log_e \left(\frac{3}{2}\right)$

[Step-by-step solution ► prepwiser.in/questions/VYbZITqE5k](https://www.prepwiser.in/questions/VYbZITqE5k)

If $f : R \rightarrow R$ is given by $f(x) = x + 1$, then the value of

$$\lim_{n \rightarrow \infty} \frac{1}{n} \left[f(0) + f\left(\frac{5}{n}\right) + f\left(\frac{10}{n}\right) + \dots + f\left(\frac{5(n-1)}{n}\right) \right]$$

is :

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

(B) $\frac{5}{2}$

(C) $\frac{1}{2}$

(D) $\frac{7}{2}$

[Step-by-step solution ► prepwiser.in/questions/NxKSSvaaVT](https://www.prepwiser.in/questions/NxKSSvaaVT)

Let $f : (0, 2) \rightarrow R$ be defined as $f(x) = \log_2(1 + \tan(\frac{\pi x}{4}))$. Then,

$$\lim_{n \rightarrow \infty} \frac{2}{n} \left(f\left(\frac{1}{n}\right) + f\left(\frac{2}{n}\right) + \dots + f(1) \right)$$

is equal to _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/UahMA7eC97](https://www.prepwiser.in/questions/UahMA7eC97)

Answer key — Definite Integration

Numbers match the question numbers above. For full working, open the solution link under each question.

1	C	2	D	3	B	4	A	5	D	6	A	7	A	8	8
9	C	10	A	11	12	12	B	13	B	14	B	15	D	16	A
17	C	18	B	19	D	20	B	21	23	22	B	23	B	24	D
25	1	26	A	27	A	28	8	29	C	30	C	31	8	32	A
33	C	34	5	35	176	36	15	37	A	38	B	39	6	40	2
41	B	42	41	43	C	44	18	45	B	46	575	47	B	48	C
49	B	50	6	51	14	52	A	53	63	54	13	55	A	56	A
57	A	58	A	59	C	60	B	61	20	62	2	63	D	64	B
65	A	66	104	67	C	68	B	69	24	70	D	71	B	72	D
73	C	74	D	75	B	76	C	77	D	78	A	79	6	80	3
81	D	82	C	83	1	84	34	85	C	86	D	87	5	88	B
89	C	90	B	91	C	92	B	93	5	94	1	95	B	96	B
97	C	98	A	99	C	100	A	101	B	102	B	103	512	104	D
105	B	106	A	107	16	108	C	109	A	110	D	111	B	112	A
113	2	114	1	115	A	116	D	117	3	118	A	119	D	120	B
121	C	122	B	123	21	124	A	125	D	126	A	127	1	128	1
129	C	130	A	131	A	132	A	133	C	134	112	135	A	136	A
137	219	138	C	139	C	140	D	141	B	142	A	143	B	144	A
145	D	146	10	147	5	148	6	149	B	150	C	151	C	152	D
153	C	154	8	155	16	156	C	157	C	158	155	159	B	160	B
161	C	162	C	163	5	164	C	165	B	166	A	167	B	168	D
169	D	170	1												

Want the next chapter?

All Mathematics chapters, every JEE Main PYQ, free with solutions: [prepwisar.in](https://www.prepwisar.in)