
DDCET 2025
अब की बार - 180 पार
MATHS
DEFINITE INTEGRATION
બ્રહ્માસ્ત્ર
- FREE SERIES -
- ENG + GUJ MEDIUM -

$$\int_a^b f(x)\,dx = \Big[F(x)\Big]_a^b$$

$$\int_a^a f(x)\,dx = 0$$

$$\int_a^b f(x)\,dx = -\int_b^a f(x)\,dx$$

1

$$\int_0^{\frac{\pi}{2}} \cos x \cdot e^{\sin x}\, dx = \ldots\ldots\ldots\ldots$$

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

$\sin x = t$

$\cos x\, dx = dt$

$$\int_0^1 e^t\, dt = \left(e^t\right)_0^1 = e - e^0$$

$$= e - 1$$

2

Good

$$\int_a^b \frac{\log x}{x}\,dx = \text{..........} \quad (\text{where } a\ b \in R^+)$$

(A) $\frac{1}{2}\log ab$ (B) $\log\left(\frac{b}{a}\right)$ (C) $2\log\left(\frac{b}{a}\right)$ $\boxed{\text{(D)}}$ $\frac{1}{2}\log(ab)\log\left(\frac{b}{a}\right)$

$$\int_a^b (\log x)^1 \cdot \frac{1}{x}\,dx = \left[\frac{(\log x)^2}{2}\right]_a^b$$

$$= \frac{1}{2}\left[\underbrace{(\log b)^2}_{x^2} - \underbrace{(\log a)^2}_{y^2}\right]$$

$$= (x+y)(x-y)$$

$$= \frac{1}{2}(\log b + \log a)\cdot(\log b - \log a)$$

$$= \frac{1}{2}\log ab \cdot \log\frac{b}{a}$$

3

$\sin\left(\frac{\pi}{2}-x\right)$

$$I = \int_0^{\frac{\pi}{2}} \frac{2^{\sin x}}{2^{\sin x}+2^{\cos x}}\,dx = \ldots\ldots \quad (1)$$

$x \to \frac{\pi}{2}-x$

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

$$I = \int_0^{\frac{\pi}{2}} \frac{2^{\cos x}}{2^{\cos x}+2^{\sin x}}\,dx \quad - (2)$$

(1) + (2)

$$2I = \int_0^{\frac{\pi}{2}} \frac{2^{\sin x}+2^{\cos x}}{2^{\sin x}+2^{\cos x}}\,dx$$

$$2I = \int_0^{\frac{\pi}{2}} 1\,dx$$

$$2I = (x)_0^{\frac{\pi}{2}}$$

$$2I = \frac{\pi}{2} - 0$$

$$I = \frac{\pi}{4}$$

5

$$\int_{-e}^{e} \quad +(-x)^5$$

$$I = \int_{-e}^{e} \log\left(\frac{e^5 - x^5}{e^5 + x^5}\right) dx = \text{..........} \quad —(1)$$

(A) e (B) 5 $\boxed{\text{(C) } 0}$ (D) $-e$

$x \to -x$

$$I = \int_{-e}^{e} \log\left(\frac{e^5 + x^5}{e^5 - x^5}\right) dx \quad —(2)$$

$$2I = \int_{-e}^{e} \left\{\log(\quad) + \log(\quad)\right\} dx$$

$$2I = \int_{-e}^{e} \log(1)\, dx$$

$$2I = 0$$

$$I = 0$$

6

$\frac{\pi}{8} + \frac{3\pi}{8} = \frac{4\pi}{8} = \frac{\pi}{2}$

$$\int_{\pi/8}^{3\pi/8} \frac{1}{1+\sqrt{\tan x}}\,dx = \;..........$$

(A) $\frac{\pi}{4}$ (B) $\boxed{\frac{\pi}{8}}$ (C) $\frac{\pi}{2}$ (D) 0

$I = \dfrac{\frac{3\pi}{8} - \frac{\pi}{8}}{2} = \dfrac{\frac{\cancel{2}\pi}{8}}{\cancel{2}} = \frac{\pi}{8}$

$0 + 4028 - x$ $\quad$ $\cancel{4028} - (\cancel{4028} - x)$

7

$$I = \int_0^{4028} \frac{f(x)}{f(x) + f(4028 - x)}\, dx = \text{.........} \quad \text{—(1)}$$

(A) 4028 (B) 0 $\boxed{\text{(C) } 2014}$ (D) 8056

$x \to 4028 - x$

$$I = \int_0^{4028} \frac{f(4028-x)}{f(4028-x) + f(x)}\, dx \quad \text{—(2)}$$

$$2I = \int_0^{4028} \frac{f(x) + f(4028-x)}{f(x) + f(4028-x)}\, dx$$

$$2I = \int_0^{4028} 1\, dx$$

$$2I = (x)_0^{4028}$$

$$2I = 4028 - 0$$

$$I = 2014$$

8

$$\int_{4}^{9} \frac{dx}{x-\sqrt{x}} = \ldots\ldots\ldots\ldots$$

(A) log 2 $\quad$ $\boxed{\text{(B) log 4}}$ $\quad$ (C) log 3 $\quad$ (D) – log 2

$\boxed{\sqrt{x} = t}$

$x = t^2$

$1 \cdot dx = 2t\,dt$

$$\int_4^9 \frac{1}{\sqrt{x}\sqrt{x}-\sqrt{x}}\,dx = \int_4^9 \frac{1}{\sqrt{x}(\sqrt{x}-1)}\,dx$$

$$= 2\int_4^9 \frac{\frac{1}{2\sqrt{x}}}{\sqrt{x}-1}\,dx$$

$$= 2\left[\log|\sqrt{x}-1|\right]_4^9$$

$$\int_2^3 \frac{2t}{t^2-t}\,dt$$

$$\int_2^3 \frac{2\cancel{t}}{\cancel{t}(t-1)}\,dt$$

$$2\int_2^3 \frac{1}{t-1}\,dt$$

$$= 2\left[\log(t-1)\right]_2^3$$

$$= 2\left[\log 2 - 0\right]$$

$$= 2\log 2$$

$$= \log 4$$

9 $\displaystyle\int_{-1}^{\sqrt{3}} \frac{dx}{1^2+x^2} = \text{..........}$.

$\boxed{\text{(A)}}$ $\frac{7\pi}{12}$ (B) $\frac{\pi}{6}$ (C) $\frac{\pi}{12}$ (D) $\frac{5\pi}{12}$

$$\left[\frac{1}{1}\tan^{-1}\frac{x}{1}\right]_{-1}^{\sqrt{3}} = \tan^{-1}(\sqrt{3}) - \tan^{-1}(-1)$$

$$= \cancel{\tan^{-1}}\left(\cancel{\tan}\frac{\pi}{3}\right) + \cancel{\tan^{-1}}\left(\cancel{\tan}\frac{\pi}{4}\right)$$

$$= \frac{\pi}{3} + \frac{\pi}{4}$$

$$= \frac{7\pi}{12}$$

$\sin^{-1}(-x)$

$\tan^{-1}(-x) = -\tan^{-1}x$

$\operatorname{cosec}^{-1}(-x)$

$\cos^{-1}(-x) = \pi - \cos^{-1}x$

10

$$I = \int_0^{\pi} \cos^3 x \cdot \sin^4 x \, dx = \text{..........} \quad \text{— (1)}$$

(A) $-\pi$ $\qquad x \to \pi - x$ $\qquad$ (B) 0 $\qquad$ (C) π $\qquad$ (D) 2π

$$I = \int_0^{\pi} \cos^3(\pi - x)\, \sin^4(\pi - x)\, dx$$

$$I = \int_0^{\pi} -\cos^3 x \, \sin^4 x \, dx \quad \text{— (2)}$$

$$2I = 0$$

$$I = 0$$

11

$$I = \int_{-\frac{\pi}{6}}^{\frac{\pi}{6}} \sin^5 x \cos^2 x \; dx = \dots\dots\dots .$$

$x \to -x$

(A) $\frac{1}{\sqrt{2}} - 1$

$\boxed{\text{(B) } 0}$

(C) $\left(\frac{\pi}{6}\right)^5 - \left(\frac{\pi}{6}\right)^2$

(D) $\left(\frac{\pi}{6}\right)^2 - \left(\frac{\pi}{6}\right)^5$

12

$$\int_{-\pi/4}^{\pi/4} \sin^2 x \, dx = \ldots\ldots .$$

(A) 0 (B) $\frac{1}{2}-\frac{\pi}{4}$ $\boxed{\text{(C)}}$ $\frac{\pi}{4}-\frac{1}{2}$ (D) $\frac{\pi}{4}+\frac{1}{2}$

$\sin^2 x = \frac{1-\cos 2x}{2}$

$\cancel{2}\frac{\pi}{\cancel{4}_2}$

$$\int_{-\pi/4}^{\pi/4} \frac{1-\cos 2x}{2}\, dx = \frac{1}{2}\left[\left(x-\frac{\sin 2x}{2}\right)\right]_{-\pi/4}^{\pi/4}$$

$$= \frac{1}{2}\left\{\left[\frac{\pi}{4}-\frac{\sin\frac{\pi}{2}}{2}\right]-\left[-\frac{\pi}{4}+\frac{\sin\left(+\frac{\pi}{2}\right)}{2}\right]\right\}$$

$$= \frac{1}{2}\left[\left(\frac{\pi}{4}-\frac{1}{2}\right)+\frac{\pi}{4}-\frac{1}{2}\right]$$

$$\frac{1}{2}\left[\frac{\pi}{2}-1\right]$$

$$= \frac{\pi}{4}-\frac{1}{2}$$

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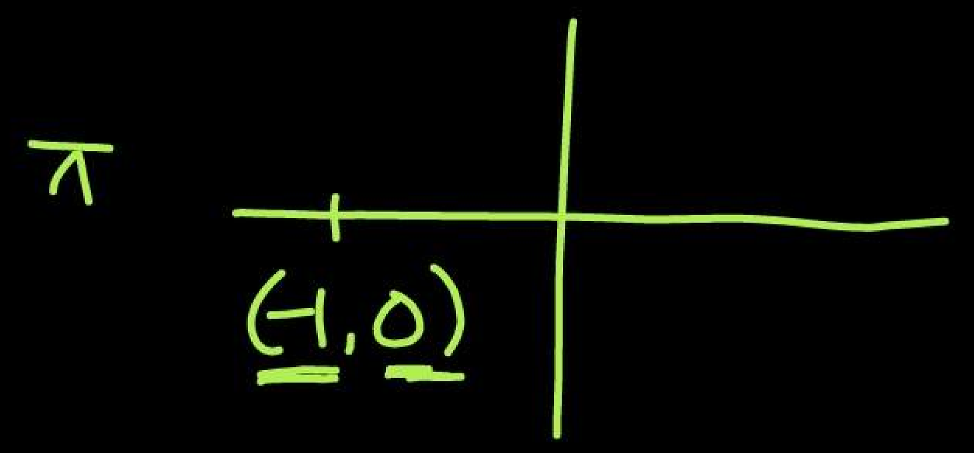
$$\int_{\pi/6}^{\pi/3} \frac{1\,dx}{1+\sqrt{\cot x}} = \ldots\ldots .$$

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$ $\boxed{\text{(C) } \frac{\pi}{12}}$ (D) $\frac{\pi}{2}$

$$I = \frac{b-a}{2} = \frac{\frac{\pi}{3} - \frac{\pi}{6}}{2} = \frac{\pi}{12}$$

14



$$\int_0^{\pi} \sin x \, dx = \ldots\ldots\ldots$$

(A) 0 $\boxed{\text{(B) } 2}$ (C) 1 (D) –2

$$\left[-\cos x\right]_0^{\pi} = (-\cos \pi) - (-\cos 0)$$

$$= -(-1) - (-1)$$

$$= 1 + 1$$

$$= 2$$

15

The value of $I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^3 - \cos x + \tan^5 x)$ is .... — (1)

(A) π $\quad$ $\boxed{\text{(B) } -2}$ $\quad$ (C) 0 $\quad$ (D) 1

$x \to -x$

$$I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (-x^3 - \cos x - \tan^5 x)\, dx \quad — (2)$$

(1) + (2) $\quad \cancel{2} I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (-\cancel{2} \cos x)\, dx$

$$I = -(\sin x)_{-\frac{\pi}{2}}^{\frac{\pi}{2}} = -(1 - (-1)) = -2$$

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$I = \int_{-1}^{1} \sin^5 x \cos^4 x \; dx = \ldots\ldots\ldots\ldots$

$x \to -x$

(A) -2 (B) 2 $\boxed{\text{(C) } 0}$ (D) 3

17

The value of $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sqrt{\cos x}}{\sqrt{\sin x}+\sqrt{\cos x}}\, dx$ is ......

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) 0 (D) $\frac{\pi}{12}$

$$I = \frac{b-a}{2} = \frac{\pi}{12}$$

19

$$\int_{2}^{3} \frac{x}{x^2+1}\,dx = \ldots\ldots$$

(A) $\log(x^2 + 1)$ $\boxed{\text{(B)}}$ $\frac{1}{2}\log(2)$ (C) $\frac{1}{2}\log(5)$ (D) $\frac{1}{2}\log\left(\frac{3}{2}\right)$

$$\frac{1}{2}\int_{2}^{3} \frac{2x}{(x^2+1)^1}\,dx$$

$$\frac{1}{2}\left[\log|x^2+1|\right]_2^3 = \frac{1}{2}(\log 10 - \log 5)$$

$$= \frac{1}{2}\left(\log \frac{10}{5}\right)$$

$$= \frac{1}{2}\log 2$$

$$\int \frac{1}{x\sqrt{x^2-a^2}}\,dx = \frac{1}{a}\sec^{-1}\frac{x}{a}$$

$\sin\theta = \frac{4}{5}$

$\theta = \sin^{-1}\frac{4}{5}$

$\frac{\pi}{2}$ ②

21

$$\int_{\sqrt{2}}^{k} \frac{1\,dx}{x\sqrt{x^2-1^2}} = \frac{\pi}{2}, \text{ then } k = \text{......}$$

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

$$\left(\frac{1}{1}\sec^{-1}\frac{x}{1}\right)_{\sqrt{2}}^{k} = \frac{\pi}{2}$$

$$\sec^{-1}k - \sec^{-1}\sqrt{2} = \frac{\pi}{2}$$

$$\sec^{-1}k - \cancel{\sec^{-1}}\left(\cancel{\sec}\frac{\pi}{4}\right) = \frac{\pi}{2}$$

$$\sec^{-1}k = \frac{\pi}{2} + \frac{\pi}{4}$$

$$k = \sec\left(\frac{\pi}{2} + \frac{\pi}{4}\right) = -\operatorname{cosec}\frac{\pi}{4} = -\sqrt{2}$$

22

H.W $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^3 + x\cos x + \tan^5 x + 1)dx$ = ...

$x \to -x$

$\boxed{\text{(A) } \pi}$ (B) 1 (C) 0 (D) 2

28

$0+1-x$

$$I = \int_0^1 x(1-x)^4\,dx = \ldots\ldots$$

(A) 0 $\quad x \to 1-x$

(B) $\frac{1}{45}$

(C) $\frac{1}{30}$

(D) $\frac{1}{15}$

$$I = \int_0^1 (1-x)\left(1-(1-x)\right)^4$$

$$I = \int_0^1 (1-x)x^4\,dx = \int_0^1 (x^4 - x^5)\,dx = \left(\frac{x^5}{5} - \frac{x^6}{6}\right)_0^1 = \left(\frac{1}{5}-\frac{1}{6}\right)-(0-0)$$

$$= \frac{1}{30}$$

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$$\frac{1}{1+\tan^n x}$$

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{1}{1+\sqrt{\tan x}}\,dx = \ldots\ldots\ldots$$

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{6}$ $\boxed{\text{(C) } \frac{\pi}{12}}$ (D) $\frac{\pi}{2}$

$$I = \frac{b-a}{2} = \frac{\frac{\pi}{3}-\frac{\pi}{6}}{2} = \frac{\frac{\pi}{6}}{2} = \frac{\pi}{12}$$

JAGRUT AWAAZ

30

$$\int_1^e \log x \, dx = \text{........}$$

(A) 1 (B) $e + 1$ (C) $e - 1$ (D) 0

$$\left[x \log x - x\right]_1^e = (e \log e - e) - (0 - 1)$$

$$= e(1) - e + 1$$

$$= 1$$

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$$I = \int_{-1}^{1} \sin^7 x \cdot \cos^6 x \; dx = \ldots\ldots .$$ — 1

(A) 2 $\quad x \to -x$

(B) –1

(C) 0

(D) 1

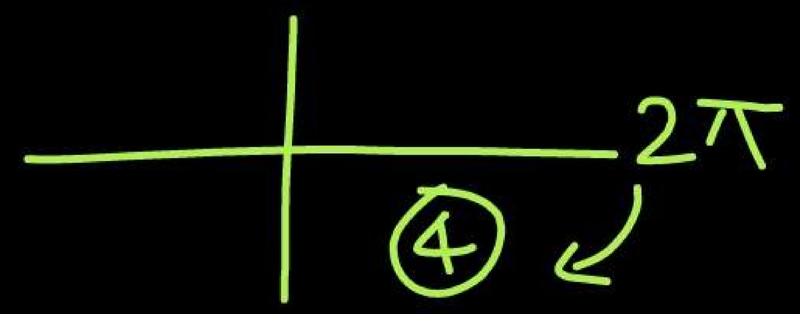
$$I = \int_{-1}^{1} \sin^7(-x)\, \cos^6(-x)\, dx$$

$$I = \int_{-1}^{1} -\sin^7 x \, \cos^6 x \, dx \quad — 2$$

$$2I = 0$$

$$I = 0$$

34



$$I = \int_0^{2\pi} \sin^3 x \cos^2 x \, dx = \text{........} \quad \text{— } 1$$

(A) -1 (B) 2π (C) 1 (D) 0

$x \to 2\pi - x$

$$I = \int_0^{2\pi} \sin^3(2\pi - x)\cos^2(2\pi - x)\, dx$$

$$I = \int_0^{2\pi} -\sin^3 x \cos^2 x \, dx \quad \text{— } 2$$

$1 + 2$

$2I = 0$

$\boxed{I = 0}$

39

$$I = \int_{-\pi/2}^{\pi/2} (x^{13} + x\cos x + \tan^{15} x + 1)\, dx \; - (1) \; = \;\ldots\ldots$$

$x \to -x$

(A) 0 (B) 2 $\boxed{\text{(C) } \pi}$ (D) 1

$$I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left((-x^{13}) - x\cos x - \tan^{15} x + 1 \right) dx \; - (2)$$

$$(1) + (2) \quad \cancel{2}I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cancel{2} \cdot 1\, dx$$

$$I = (x)_{-\pi/2}^{\pi/2}$$

$$I = \frac{\pi}{2} - \left(-\frac{\pi}{2}\right) = \pi$$

41

$$I = \int_{\pi/6}^{\pi/3} \frac{1}{1+\tan^4 x}\,dx = \text{.........}$$

(A) $\frac{\pi}{2}$ (B) $\boxed{\frac{\pi}{12}}$ (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{6}$

$$I = \frac{b-a}{2} = \frac{\frac{\pi}{3} - \frac{\pi}{6}}{2} = \frac{\frac{\pi}{6}}{2} = \frac{\pi}{12}$$

$x \to \underbrace{L.L + U.P}_{0} - x$

42

$$I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (x^5 - x^3 \cos x + \sin^3 x - 3)\, dx = \ldots\ldots\ldots \quad — 1$$

$x \to -x$

(A) $-\pi$ (B) 3π $\boxed{\text{(C) } -3\pi}$ (D) 0

$$I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left((-x)^5 - (-x)^3 \cos(-x) + \sin^3(-x) - 3\right) dx$$

$$I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(-x^5 + x^3 \cos x - \sin^3 x - 3\right) dx \quad — 2$$

1 + 2

$$2I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (-6)\, dx$$

$$2I = (-6) \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 1\, dx$$

$$I = -3\, (x)_{-\frac{\pi}{2}}^{\pi/2}$$

$$I = -3\left(\frac{\pi}{2} - \left(-\frac{\pi}{2}\right)\right)$$

$$I = -3\left(\frac{\pi}{2} + \frac{\pi}{2}\right)$$

$$I = -3\pi$$

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ILATE

$$\int uv\,dx = u\int v\,dx - \int\left(\frac{du}{dx}\cdot\int v\,dx\right)dx$$

$$\int_0^1 \underset{u}{x}\,\underset{v}{e^x}\;dx = \ldots\ldots\ldots$$

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

$$xe^x - \int 1\cdot e^x\,dx$$

$$\left[xe^x - e^x\right]_0^1 = (e-e) - (0-1)$$

$$= 1$$

$$\int \frac{1}{x^2+a^2}\,dx = \frac{1}{a}\tan^{-1}\frac{x}{a} + c$$

50

$$\int_1^{\sqrt{3}} \frac{1\,dx}{1^2 + x^2} = \text{.........}\ .$$

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

$$\left(\frac{1}{1}\tan^{-1}\frac{x}{1}\right)_1^{\sqrt{3}} = \tan^{-1}\sqrt{3} - \tan^{-1}(1)$$

$$= \cancel{\tan^{-1}}\left(\cancel{\tan}\frac{\pi}{3}\right) - \cancel{\tan^{-1}}\left(\cancel{\tan}\frac{\pi}{4}\right)$$

$$= \frac{\pi}{3} - \frac{\pi}{4}$$

$$= \frac{4\pi - 3\pi}{12} = \frac{\pi}{12}$$

* King Rule: (Definite Int)

① $\log(\text{Trigo})$

② $-a$ to a

③ Question $\boxed{L.L + U.P - x}$ દેખાય.

④ $\sin^m x \cos^n x$, $\sin^n x$, $\cos^n x$

⑤ $\displaystyle\int_a^b \frac{\sin^n x}{\sin^n x + \cos^n x}$, $\displaystyle\int_a^b \frac{\tan^n x}{\tan^n x + \cot^n x}$, $\displaystyle\int_a^b \frac{1}{1 + \tan^n x}$, $\displaystyle\int_a^b \frac{\sec^n x}{\sec^n x + \csc^n x} \rightarrow I = \frac{b-a}{2}$

or

$\cot^n x$

$\boxed{a + b = \frac{\pi}{2}}$