01 July 2024 Live Classes Schedule

8:00AM	01 JULY 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	01 JULY 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

9:00AM	ONLINE COURSE INTRODUCTION	ANURADHA MA'AM

NDA 2 2024 LIVE CLASSES

11:30AM	GK - MODERN HISTORY - CLASS 3	RUBY MA'AM
1:00PM	GS - PHYSICS - CLASS 1	NAVJYOTI SIR
2:30PM	GS - CHEMISTRY MCQS - CLASS 6	SHIVANGI MA'AM
4:00PM	MATHS - INDEFINITE & DEFINITE INTEGRATION - CLASS 3	NAVJYOTI SIR
5:30PM	ENGLISH - ORDERING OF SENTENCES - CLASS 1	ANURADHA MA'AM

CDS 2 2024 LIVE CLASSES

11:30AM	GK - MODERN HISTORY - CLASS 3	RUBY MA'AM
1:00PM	GS - PHYSICS - CLASS 1	NAVJYOTI SIR
2:30PM	GS - CHEMISTRY MCQS - CLASS 6	SHIVANGI MA'AM
5:30PM	ENGLISH - ORDERING OF SENTENCES - CLASS 1	ANURADHA MA'AM

SSBCrack
EXAMS

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Q) What is $\int \tan^{-1}(\sec x + \tan x)dx$ equal to?

(a) $\dfrac{\pi x}{4} + \dfrac{x^2}{4} + c$

(b) $\dfrac{\pi x}{2} + \dfrac{x^2}{4} + c$

(c) $\dfrac{\pi x}{4} + \dfrac{\pi x^2}{4} + c$

(d) $\dfrac{\pi x}{4} - \dfrac{x^2}{4} + c$

$$\sec x + \tan x = \frac{1}{\cos x} + \frac{\sin x}{\cos x}$$

$$\frac{1 + \sin x}{\cos x} = \frac{(1) + 2\sin x/2 \cos x/2}{\cos^2 x/2 - \sin^2 x/2}$$

$$\frac{\sin^2 x/2 + \cos^2 x/2 + 2\sin x/2 \cos x/2}{(\cos x/2 + \sin x/2)(\cos x/2 - \sin x/2)}$$

$\longrightarrow (\sin x/2 + \cos x/2)^2$

(Memorize)

$$\frac{\cos x/2 + \sin x/2}{\cos x/2 - \sin x/2}$$

$$= \frac{1 + \tan x/2}{1 - \tan x/2} = \frac{\tan \pi/4 + \tan x/2}{1 - \tan \frac{\pi}{4}\tan x/2}$$

$$= \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$$

$$\tan^{-1}\left(\tan\left(\frac{\pi}{4} + \frac{x}{2}\right)\right)$$

$$\int\left(\frac{\pi}{4} + \frac{x}{2}\right)dx = \frac{\pi}{4}x + \frac{x^2}{4} + c$$

Q) What is $\int \tan^{-1}(\sec x + \tan x)\,dx$ equal to?

(a) $\dfrac{\pi x}{4} + \dfrac{x^2}{4} + c$

(b) $\dfrac{\pi x}{2} + \dfrac{x^2}{4} + c$

(c) $\dfrac{\pi x}{4} + \dfrac{\pi x^2}{4} + c$

(d) $\dfrac{\pi x}{4} - \dfrac{x^2}{4} + c$

Ans: (a)

Q) Let $f(x)$ be an indefinite integral of $\sin^2 x$. Consider the following statements :

Statement 1 : The function $f(x)$ satisfies $f(x + \pi) = f(x)$ for all real x.

Statement 2 : $\sin^2(x + \pi) = \sin^2 x$ for all real x.

Which one of the following is correct in respect of the above statements?

(a) Both the statements are true and Statement 2 is the correct explanation of Statement 1

(b) Both the statements are true but Statement 2 is not the correct explanation of Statement 1

(c) Statement 1 is true but Statement 2 is false

(d) Statement 1 is false but Statement 2 is true

$$\sin(x+\pi)$$
$$= \sin(\pi+x)$$
$$= -\sin x$$

① $f(x+\pi) = \dfrac{\pi+x}{4} - \dfrac{1}{4}\sin^2\left(\pi+x\right) + c$

$= \dfrac{\pi}{4} + \dfrac{x}{4} - \dfrac{1}{4}\sin(2\pi+2x) + c$

$= \dfrac{x}{4} - \dfrac{1}{4}\sin 2x + c$

$= f(x)$

$f(x) = \int \sin^2 x \, dx = \dfrac{1}{2}\int 2\sin^2 x \, dx = \dfrac{1}{2}\int (1 - \cos 2x)\, dx$

$= \dfrac{1}{2}\left(\dfrac{x}{2} - \dfrac{\sin 2x}{2}\right) + c = \dfrac{x}{4} - \dfrac{1}{4}\sin 2x + c$

Q) Let $f(x)$ be an indefinite integral of $\sin^2 x$. Consider the following statements :

Statement 1 : The function $f(x)$ satisfies $f(x + \pi) = f(x)$ for all real x.

Statement 2 : $\sin^2(x + \pi) = \sin^2 x$ for all real x.

Which one of the following is correct in respect of the above statements?

(a) Both the statements are true and Statement 2 is the correct explanation of Statement 1

(b) Both the statements are true but Statement 2 is not the correct explanation of Statement 1

(c) Statement 1 is true but Statement 2 is false

(d) Statement 1 is false but Statement 2 is true

Ans: (b)

Q) What is $\int \dfrac{xe^x\,dx}{(x+1)^2}$ equal to?

(a) $(x+1)^2\,e^x+c$

(b) $(x+1)e^x+c$

(c) $\dfrac{e^x}{x+1}+c$

(d) $\dfrac{e^x}{(x+1)^2}+c$

where c is the constant integration.

$\int e^x\left(f(x)+f'(x)\right)dx =$

$e^x f(x)+c$

$$\int e^x\left(\frac{x}{(x+1)^2}\right)dx =$$

$$\int e^x\left(\underset{f(x)}{\frac{1}{x+1}} - \underset{f'(x)}{\frac{1}{(x+1)^2}}\right) = \left\{e^x\left(\frac{1}{x+1}\right)+c\right\}$$

Q) What is $\int \dfrac{xe^x \, dx}{(x+1)^2}$ equal to?

(a) $(x+1)^2 \, e^x + c$

(b) $(x+1)e^x + c$

(c) $\dfrac{e^x}{x+1} + c$

(d) $\dfrac{e^x}{(x+1)^2} + c$

where c is the constant integration.

Ans: (c)

Q) What is $\int e^{e^x} e^x dx$ equal to ?

(a) $e^{e^x} + c$

(b) $2e^{e^x} + c$

(c) $e^{e^x} e^x + c$

(d) $2e^{e^x} e^x + c$

$$\text{Let } e^x = t$$

$$e^x dx = dt$$

$$\int e^t dt = e^t + c = e^{e^x} + c$$

Q) What is $\int e^{e^x} e^x dx$ equal to ?

(a) $e^{e^x} + c$

(b) $2e^{e^x} + c$

(c) $e^{e^x} e^x + c$

(d) $2e^{e^x} e^x + c$

Ans: (a)

Q) What is $\int_0^{\frac{\pi}{2}} e^{\ln(\cos x)} \, dx$ equal to?

(a) −1

(b) 0

(c) 1

(d) 2

$\pi/2$

$\int_0 (\cos x) \, dx$

$\left[\sin x\right]_0^{\pi/2}$

$\sin\frac{\pi}{2} - \sin 0 \quad = 1 - 0$

$= 1$

$e^{\ln x} = x$

$e^{\ln x} = z$

$\ln x \, \ln e = \ln z$

$\ln x = \ln z$

$x = z$

$a^{\log_a x} = x$

Q) What is $\int_0^{\frac{\pi}{2}} e^{\ln(\cos x)} \, dx$ equal to?

(a) −1

(b) 0

(c) 1

(d) 2

Ans: (c)

Q) What is $\int_0^\pi \ln\left(\tan\frac{x}{2}\right) dx$ equal to?

$$\int_0^a f(x)\, dx = \int_0^a f(a-x)\, dx$$

(a) 0

$$I = \int_0^\pi \ln\left(\tan\frac{x}{2}\right) dx \longrightarrow \text{①}$$

(b) $\dfrac{1}{2}$

(c) 1

$$I = \int_0^\pi \ln\left(\tan\left(\frac{\pi-x}{2}\right)\right) dx = \int_0^\pi \ln\left(\tan\left(\frac{\pi}{2}-\frac{x}{2}\right)\right) dx = \int_0^\pi \ln\left(\cot\left(\frac{x}{2}\right)\right) dx \longrightarrow \text{②}$$

(d) 2

$$\boxed{\log a + \log b = \log(ab)}$$

$$\text{①} + \text{②}, \quad 2I = \int_0^\pi \ln\left(\tan\frac{x}{2}\right)\left(\cot\left(\frac{x}{2}\right)\right) dx = \int_0^\pi \ln(1)\, dx = 0 \quad \Rightarrow \quad \boxed{I = 0}$$

Q) What is $\int_0^\pi \ln\left(\tan\dfrac{x}{2}\right) dx$ equal to?

(a) 0

(b) $\dfrac{1}{2}$

(c) 1

(d) 2

Ans: (a)

$2 \sin x \cos x = \sin 2x$

Q) What is the value of $\int_{\pi/6}^{\pi/4} \frac{dx}{\sin x \cos x}$?

(a) $2 \ln \sqrt{3}$

(b) $\ln \sqrt{3}$

(c) $2 \ln 3$

(d) $4 \ln 3$

$$\int_{\pi/6}^{\pi/4} \frac{dx}{\left(\frac{\sin 2x}{2}\right)} = 2 \int_{\pi/6}^{\pi/4} \frac{dx}{\sin 2x}$$

$$= 2 \int_{\pi/6}^{\pi/4} \csc 2x \, dx = -\frac{2}{2} \left[\log \cot x\right]_{\pi/6}^{\pi/4} = \left[\log \cot x\right]_{\pi/4}^{\pi/6} =$$

Q) What is the value of $\int_{\pi/6}^{\pi/4} \dfrac{dx}{\sin x \cos x}$?

(a) $2 \ln \sqrt{3}$

(b) $\ln \sqrt{3}$

(c) $2 \ln 3$

(d) $4 \ln 3$

Ans: (b)

Q) What is $\int_a^b [x]\,dx + \int_a^b [-x]\,dx$ equal to, where [,] is the greatest integer function?

(a) $b - a$ (b) $a - b$ (c) 0   (d) $2(b-a)$

$$\int_a^b \left([x] + [-x]\right) dx \, , \quad \text{when } x \notin Z$$

$$\int_a^b (-1)\,dx = -\int_a^b dx = [x]_b^a = a - b$$

$$4 \qquad 5 \qquad -4 \qquad -5$$

$$[4.7] \qquad [-4.7]$$

$$4 + (-5) = -1 \checkmark$$

Q) What is $\displaystyle\int_a^b [x]\,dx + \int_a^b [-x]\,dx$ equal to, where $[\,]$ is the greatest integer function?

(a) $b-a$ (b) $a-b$ (c) 0 (d) $2(b-a)$

Ans: (b)

Q) The value of $\int_0^{\frac{\pi}{4}} \sqrt{\tan x} \, dx + \int_0^{\frac{\pi}{4}} \sqrt{\cot x} \, dx$ is equal to

(a) $\dfrac{\pi}{4}$

(b) $\dfrac{\pi}{2}$

(c) $\dfrac{\pi}{2\sqrt{2}}$

(d) $\dfrac{\pi}{\sqrt{2}}$

$$\int_0^{\pi/4} \frac{\sqrt{\sin x}}{\sqrt{\cos x}} + \frac{\sqrt{\cos x}}{\sqrt{\sin x}} \, dx$$

$$\frac{\sin x + \cos x}{\sqrt{\sin x \cos x}} = \frac{\sqrt{2}(\sin x + \cos x)}{\sqrt{2 \sin x \cos x}}$$

$$= \frac{\sqrt{2}(\sin x + \cos x)}{\sqrt{1 - (\sin^2 x + \cos^2 x - 2 \sin x \cos x)}}$$

$$= \frac{\sqrt{2}(\sin x + \cos x)}{\sqrt{1 - (\sin x - \cos x)^2}}$$

$$\text{Let } t = \sin x - \cos x \Rightarrow dt = (\sin x + \cos x) dx$$

$$I = \int \frac{\sqrt{2}\,(\sin x + \cos x)\, dx}{\sqrt{1 - (\sin x - \cos x)^2}}$$

$$t = \sin x - \cos x \checkmark$$

$$dt = (\cos x + \sin x)\, dx$$

$$x = 0 \Rightarrow t = -1 \checkmark$$

$$x = \pi/4 \Rightarrow t = 0$$

$$= \sqrt{2} \int_{-1}^{0} \frac{dt}{\sqrt{1 - t^2}} = = \sqrt{2} \left[\sin^{-1}(t) \right]_{-1}^{0}$$

$$= \sqrt{2} \left(0 - \left(\frac{-\pi}{2} \right) \right)$$

$$= \frac{\pi}{\sqrt{2}} \, //$$

Q) The value of $\int_0^{\frac{\pi}{4}} \sqrt{\tan x}\ dx + \int_0^{\frac{\pi}{4}} \sqrt{\cot x}\ dx$ is equal to

(a) $\dfrac{\pi}{4}$

(b) $\dfrac{\pi}{2}$

(c) $\dfrac{\pi}{2\sqrt{2}}$

(d) $\dfrac{\pi}{\sqrt{2}}$

Ans: (d)

Q) What is $\int \dfrac{dx}{2x^2 - 2x + 1}$ equal to?

(a) $\dfrac{\tan^{-1}(2x - 1)}{2} + c$

(b) $2 \tan^{-1}(2x - 1) + c$

(c) $\dfrac{\tan^{-1}(2x + 1)}{2} + c$

(d) $\tan^{-1}(2x - 1) + c$

$$\int \frac{1}{(x)^2 + (a)^2} \, dx \rightsquigarrow \frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + c$$

$$f(x) \qquad \text{constant in } a$$

$$\frac{1}{2} \int \frac{dx}{x^2 - x + \frac{1}{2}} = \frac{1}{2} \int \frac{dx}{\left(x^2 - x + \frac{1}{4}\right) - \frac{1}{4} + \frac{1}{2}} = \frac{1}{2} \int \frac{dx}{\left(x - \frac{1}{2}\right)^2 - \left(\frac{1}{2}\right)^2}$$

Q) What is $\displaystyle\int \frac{dx}{2x^2 - 2x + 1}$ equal to?

(a) $\dfrac{\tan^{-1}(2x - 1)}{2} + c$

(b) $2 \tan^{-1}(2x - 1) + c$

(c) $\dfrac{\tan^{-1}(2x + 1)}{2} + c$

(d) $\tan^{-1}(2x - 1) + c$

Ans: (d)

Q) $\int_0^{\frac{\pi}{2}} |\sin x - \cos x| \, dx$ is equal to

(a) 0

(b) $2(\sqrt{2} - 1)$

(c) $2\sqrt{2}$

(d) $2(\sqrt{2} + 1)$

Q) $\int_0^{\frac{\pi}{2}} |\sin x - \cos x| \, dx$ is equal to

(a) 0

(b) $2(\sqrt{2} - 1)$

(c) $2\sqrt{2}$

(d) $2(\sqrt{2} + 1)$

Ans: (b)

Q) What is $\int \ln(x^2)dx$ equal to?

(a) $2x\ln(x) - 2x + C$

(b) $\dfrac{2}{x} + C$

(c) $2x\ln(x) + C$

(d) $\dfrac{2\ln(x)}{x} - 2x + C$

Q) What is $\int \ln(x^2)dx$ equal to?

(a) $2x\ln(x) - 2x + C$

(b) $\dfrac{2}{x} + C$

(c) $2x\ln(x) + C$

(d) $\dfrac{2\ln(x)}{x} - 2x + C$

Ans: (a)

Q) If $I_1 = \int_e^{e^2} \dfrac{dx}{\log x}$ and $I_2 = \int_1^2 \dfrac{e^x}{x} dx$, then

(a) $I_1 = I_2$

(b) $2I_1 = I_2$

(c) $I_2 + I_1 = 0$

(d) $I_1 = 2I_2$

Q) If $I_1 = \int_e^{e^2} \dfrac{dx}{\log x}$ and $I_2 = \int_1^2 \dfrac{e^x}{x} \, dx$, then

(a) $I_1 = I_2$

(b) $2I_1 = I_2$

(c) $I_2 + I_1 = 0$

(d) $I_1 = 2I_2$

Ans: (a)

Q) What is $\int_0^1 x(1-x)^n \, dx$ equal to?

(a) $\dfrac{1}{n(n+1)}$

(b) $\dfrac{1}{(n+1)(n+2)}$

(c) 1

(d) 0

Q) What is $\int_0^1 x(1-x)^n\, dx$ equal to?

(a) $\dfrac{1}{n(n+1)}$

(b) $\dfrac{1}{(n+1)(n+2)}$

(c) 1

(d) 0

Ans: (b)

Q)If $\int_0^{\pi/2} \dfrac{\cot x}{\cot x + \cosec x} dx = m(\pi + n)$, then $m \cdot n$

is equal to

(a) $-\dfrac{1}{2}$　　　　(b) 1　　　　(c) $\dfrac{1}{2}$　　　　(d) -1

Q)If $\int_0^{\pi/2} \dfrac{\cot x}{\cot x + \operatorname{cosec} x} dx = m(\pi + n)$, then $m \cdot n$
is equal to

(a) $-\dfrac{1}{2}$ (b) 1 (c) $\dfrac{1}{2}$ (d) -1

Ans: (d)

Q) What is $\int \dfrac{\left(x^{e-1} + e^{x-1}\right)dx}{x^e + e^x}$ equal to?

(a) $\dfrac{x^2}{2} + c$

(b) $\ln(x + e) + c$

(c) $\ln(x^e + e^x) + c$

(d) $\dfrac{1}{e}\ln\left(x^e + e^x\right) + c$

Q) What is $\displaystyle\int \frac{\left(x^{e-1} + e^{x-1}\right)dx}{x^e + e^x}$ equal to?

(a) $\dfrac{x^2}{2} + c$

(b) $\ln(x + e) + c$

(c) $\ln(x^e + e^x) + c$

(d) $\dfrac{1}{e}\ln\left(x^e + e^x\right) + c$

Ans: (d)

Q) $\displaystyle\int (\ln x)^{-1}\, dx - \int (\ln x)^{-2}\, dx$ is equal to

(a) $x\,(\ln x)^{-1} + c$ (b) $x\,(\ln x)^{-2} + c$

(c) $x\,(\ln x) + c$ (d) $x\,(\ln x)^{2} + c$

Q) $\int (\ln x)^{-1} dx - \int (\ln x)^{-2} dx$ is equal to

(a) $x(\ln x)^{-1} + c$

(b) $x(\ln x)^{-2} + c$

(c) $x(\ln x) + c$

(d) $x(\ln x)^2 + c$

Ans: (a)

Q) What is the value of $\displaystyle\int_0^1 (x-1)e^{-x}dx$?

(a) 0

(b) e

(c) $\dfrac{1}{e}$

(d) $\dfrac{-1}{e}$

Q) What is the value of $\displaystyle\int_0^1 (x-1)e^{-x}dx$?

(a) 0

(b) e

(c) $\dfrac{1}{e}$

(d) $\dfrac{-1}{e}$

Ans: (d)

Q) The following question consist of two statements, one labelled as the 'Assertion (A)' and the other as 'Reason (R)'. You are to examine these two statements carefully and select the answer.

Assertion(A): $\displaystyle\int_0^{\pi} \sin^7 x\, dx = 2 \int_0^{\pi/2} \sin^7 x\, dx$

Reason(R): $\sin^7 x$ is an odd function

(a) Both A and R are individually true and R is the correct explanation of A

(b) Both A and R are individually true but R is not the correct explanation A

(c) A is true but R is false

(d) A is false but R is true

Q) The following question consist of two statements, one labelled as the 'Assertion (A)' and the other as 'Reason (R)'. You are to examine these two statements carefully and select the answer.

Assertion(A): $\displaystyle\int_{0}^{\pi} \sin^7 x \, dx = 2\int_{0}^{\pi/2} \sin^7 x \, dx$

Reason(R): $\sin^7 x$ is an odd function

(a) Both A and R are individually true and R is the correct explanation of A

(b) Both A and R are individually true but R is not the correct explanation A

(c) A is true but R is false

(d) A is false but R is true

Ans: (b)

Q) What is the value of $\int_{-1}^{1} x |x| \, dx$?

(a) 2

(b) 1

(c) $\dfrac{1}{4}$

(d) 0

Q) What is the value of $\int_{-1}^{1} x \,|\, x \,|\, dx$?

(a) 2

(b) 1

(c) $\dfrac{1}{4}$

(d) 0

Ans: (d)

Q) The value of $\int_{-2}^{2}\left(ax^3+bx+c\right)dx$ depends on which of the

following?
(a) Values of x only
(b) Values of each of a, b and c
(c) Value of c only
(d) Value of b only

Q) The value of $\int_{-2}^{2} \left(ax^3 + bx + c \right) dx$ depends on which of the following?

(a) Values of x only
(b) Values of each of a, b and c
(c) Value of c only
(d) Value of b only

Ans: (c)

Q) What is $\displaystyle\int_0^a \frac{f(a-x)}{f(x)+f(a-x)}\,dx$ equal to?

(a) a

(b) $2a$

(c) 0

(d) $\dfrac{a}{2}$

Q) What is $\int_0^a \dfrac{f(a-x)}{f(x)+f(a-x)} \, dx$ equal to?

(a) a

(b) $2a$

(c) 0

(d) $\dfrac{a}{2}$

Ans: (d)

Q) What $\int \sec x^\circ \, dx$ is equal to?

    (a) $\log(\sec x^\circ + \tan x^\circ) + c$

    (b) $\dfrac{\pi \log \tan\left(\dfrac{\pi}{4} + \dfrac{\pi}{2}\right)}{180^\circ} + c$

    (c) $\dfrac{180^\circ \log \tan\left(\dfrac{\pi}{4} + \dfrac{x}{2}\right)}{\pi} + c$

    (d) $\dfrac{180^\circ \log \tan\left(\dfrac{\pi}{4} + \dfrac{x}{360^\circ}\right)}{\pi} + c$

Q) What $\int \sec x° \, dx$ is equal to?

(a) $\log(\sec x° + \tan x°) + c$

(b) $\dfrac{\pi \log \tan \left(\dfrac{\pi}{4} + \dfrac{\pi}{2} \right)}{180°} + c$

(c) $\dfrac{180° \log \tan \left(\dfrac{\pi}{4} + \dfrac{x}{2} \right)}{\pi} + c$

(d) $\dfrac{180° \log \tan \left(\dfrac{\pi}{4} + \dfrac{x}{360°} \right)}{\pi} + c$

Ans: (a)

Q) If $0 < a < b$, then $\displaystyle\int_{a}^{b} \frac{|x|}{x}\,dx$ is equal to

(a) $|b| - |a|$

(b) $|a| - |b|$

(c) $\dfrac{|b|}{|a|}$

(d) 0

Q) If $0 < a < b$, then $\displaystyle\int_{a}^{b} \frac{|x|}{x} dx$ is equal to

(a) $|b| - |a|$

(b) $|a| - |b|$

(c) $\dfrac{|b|}{|a|}$

(d) 0

Ans: (a)

Q) What is $\int\limits_{1}^{e} x \ln x \, dx$ equal to ?

(a) $\dfrac{e + 1}{4}$

(b) $\dfrac{e^2 + 1}{4}$

(c) $\dfrac{e - 1}{4}$

(d) $\dfrac{e^2 - 1}{4}$

Q) What is $\displaystyle\int_{1}^{e} x \ln x \, dx$ equal to ?

(a) $\dfrac{e + 1}{4}$

(b) $\dfrac{e^2 + 1}{4}$

(c) $\dfrac{e - 1}{4}$

(d) $\dfrac{e^2 - 1}{4}$

Ans: (b)

Q) What is the value of $\displaystyle\int_{-\pi/4}^{\pi/4} (\sin x - \tan x)\, dx$?

(a) $-\dfrac{1}{\sqrt{2}} + \ln\left(\dfrac{1}{\sqrt{2}}\right)$

(b) $\dfrac{1}{\sqrt{2}}$

(c) 0

(d) $\sqrt{2}$

Q) What is the value of $\displaystyle\int_{-\pi/4}^{\pi/4} (\sin x - \tan x)\, dx$?

(a) $-\dfrac{1}{\sqrt{2}} + \ln\left(\dfrac{1}{\sqrt{2}}\right)$

(b) $\dfrac{1}{\sqrt{2}}$

(c) 0

(d) $\sqrt{2}$

Ans: (c)

Q) What is

$$\int_{-2}^{2} x\,dx - \int_{-2}^{2} [x]\,dx$$

equal to, where $[\cdot]$ is the greatest integer function?

(a) 0   (b) 1

(c) 2   (d) 4

Q) What is

$$\int_{-2}^{2} x\,dx - \int_{-2}^{2} [x]\,dx$$

equal to, where [·] is the greatest integer function?

(a) 0

(b) 1

(c) 2

(d) 4

Ans: (c)

Q) What is $\int \dfrac{x^4+1}{x^2+1}\, dx$ equal to?

(a) $\dfrac{x^3}{3} - x + 4\tan^{-1} x + c$

(b) $\dfrac{x^3}{3} + x + 4\tan^{-1} x + c$

(c) $\dfrac{x^3}{3} - x + 2\tan^{-1} x + c$

(d) $\dfrac{x^3}{3} - x - 4\tan^{-1} x + c$

Q) What is $\int \dfrac{x^4 + 1}{x^2 + 1} dx$ equal to?

(a) $\dfrac{x^3}{3} - x + 4\tan^{-1} x + c$ (b) $\dfrac{x^3}{3} + x + 4\tan^{-1} x + c$

(c) $\dfrac{x^3}{3} - x + 2\tan^{-1} x + c$ (d) $\dfrac{x^3}{3} - x - 4\tan^{-1} x + c$

Ans: (c)

Q) What is $\int \dfrac{1}{1+e^x}\,dx$ equal to?

(a) $x - \log x + c$

(b) $x - \log(\tan x) + c$

(c) $x - \log(1+e^x) + c$

(d) $\log(1+e^x) + c$

Q) What is $\int \dfrac{1}{1+e^x} dx$ equal to?

(a) $x - \log x + c$

(b) $x - \log(\tan x) + c$

(c) $x - \log(1+e^x) + c$

(d) $\log(1+e^x) + c$

Ans: (c)

Q) What is the area of the region bounded by the curve

$$f(x) = 1 - \frac{x^2}{4}, \ x \in [-2, 2], \text{ and the } x\text{-axis ?}$$

(a) $\dfrac{8}{3}$ sq unit

(b) $\dfrac{4}{3}$ sq unit

(c) $\dfrac{2}{3}$ sq unit

(d) $\dfrac{1}{3}$ sq unit

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Ans: (a)

Q) What is $\int_{-\pi/4}^{\pi/4} \tan^3 x \, dx$ equal to ?

(a) $\sqrt{3}$

(b) $\dfrac{1}{3}$

(c) $\dfrac{1}{2}$

(d) 0

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(c) $\dfrac{1}{2}$

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Ans: (d)

Q) What is $\displaystyle\int_{-\pi/2}^{\pi/2} |\sin x|\, dx$ equal to?

(a) 2

(b) 1

(c) π

(d) 0

Q) What is $\displaystyle\int_{-\pi/2}^{\pi/2} |\sin x|\, dx$ equal to?

(a) 2

(b) 1

(c) π

(d) 0

Ans: (a)

Q) What is $\displaystyle\int_{0}^{\pi/2} \sin 2x \, \ell n \, (\cot x) \, dx$ equal to ?

(a)   0

(b) $\pi \, \ell n \, 2$

(c) $-\pi \, \ell n \, 2$

(d) $\dfrac{\pi \, \ell n \, 2}{2}$

Q) What is $\displaystyle\int_{0}^{\pi/2} \sin 2x \, \ell n \, (\cot x) \, dx$ equal to ?

(a)   0

(b) $\pi \, \ell n \, 2$

(c) $-\pi \, \ell n \, 2$

(d) $\dfrac{\pi \, \ell n \, 2}{2}$

Ans: (a)