Q21 : $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x\,dx$

Answer :

Let $I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x\,dx$

As $\sin^2(-x) = (\sin(-x))^2 = (-\sin x)^2 = \sin^2 x$, therefore, $\sin^2 x$ is an even function.

It is known that if $f(x)$ is an even function, then $\int_{-a}^{a} f(x)\,dx = 2\int_{0}^{a} f(x)\,dx$

$$\begin{aligned}
I &= 2\int_{0}^{\frac{\pi}{2}} \sin^2 x\,dx \\
&= 2\int_{0}^{\frac{\pi}{2}} \frac{1-\cos 2x}{2}\,dx \\
&= \int_{0}^{\frac{\pi}{2}} (1-\cos 2x)\,dx \\
&= \left[x - \frac{\sin 2x}{2}\right]_{0}^{\frac{\pi}{2}} \\
&= \frac{\pi}{2}
\end{aligned}$$

Answer needs Correction? **Click Here**

Q22 : $\int_{0}^{\pi} \frac{x\,dx}{1+\sin x}$

Answer :

$$\text{Let } I = \int_{0}^{\pi} \frac{x\,dx}{1+\sin x} \qquad \ldots(1)$$

$$\Rightarrow I = \int_{0}^{\pi} \frac{(\pi - x)}{1+\sin(\pi - x)}\,dx \qquad \left(\int_{0}^{a} f(x)\,dx = \int_{0}^{a} f(a-x)\,dx\right)$$

$$\Rightarrow I = \int_{0}^{\pi} \frac{(\pi - x)}{1+\sin x}\,dx \qquad \ldots(2)$$

Adding (1) and (2), we obtain

$$\begin{aligned}
2I &= \int_{0}^{\pi} \frac{\pi}{1+\sin x}\,dx \\
\Rightarrow 2I &= \pi\int_{0}^{\pi} \frac{(1-\sin x)}{(1+\sin x)(1-\sin x)}\,dx \\
\Rightarrow 2I &= \pi\int_{0}^{\pi} \frac{1-\sin x}{\cos^2 x}\,dx \\
\Rightarrow 2I &= \pi\int_{0}^{\pi} \left\{\sec^2 x - \tan x \sec x\right\}dx \\
\Rightarrow 2I &= \pi\left[\tan x - \sec x\right]_{0}^{\pi} \\
\Rightarrow 2I &= \pi[2] \\
\Rightarrow I &= \pi
\end{aligned}$$

Answer needs Correction? **Click Here**

Q23 : $\int_{0}^{\pi} \frac{x\,dx}{1+\sin x}$

Answer :

$$\text{Let } I = \int_{0}^{\pi} \frac{x\,dx}{1+\sin x} \qquad \ldots(1)$$

$$\Rightarrow I = \int_{0}^{\pi} \frac{(\pi - x)}{1+\sin(\pi - x)}\,dx \qquad \left(\int_{0}^{a} f(x)\,dx = \int_{0}^{a} f(a-x)\,dx\right)$$

$$\Rightarrow I = \int_{0}^{\pi} \frac{(\pi - x)}{1+\sin x}\,dx \qquad \ldots(2)$$

Adding (1) and (2), we obtain

$$\begin{aligned}
2I &= \int_{0}^{\pi} \frac{\pi}{1+\sin x}\,dx \\
\Rightarrow 2I &= \pi\int_{0}^{\pi} \frac{(1-\sin x)}{(1+\sin x)(1-\sin x)}\,dx \\
\Rightarrow 2I &= \pi\int_{0}^{\pi} \frac{1-\sin x}{\cos^2 x}\,dx \\
\Rightarrow 2I &= \pi\int_{0}^{\pi} \left\{\sec^2 x - \tan x \sec x\right\}dx
\end{aligned}$$

$$\Rightarrow 2I = \pi[\tan x - \sec x]_0^{\pi}$$
$$\Rightarrow 2I = \pi[2]$$
$$\Rightarrow I = \pi$$

Answer needs Correction? Click Here

Q24 : $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^7 x\,dx$

Answer :

Let $I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^7 x dx \qquad ...(1)$

As $\sin^7(-x) = (\sin(-x))^7 = (-\sin x)^7 = -\sin^7 x$, therefore, $\sin^2 x$ is an odd function.

It is known that, if $f(x)$ is an odd function, then $\int_{-a}^{a} f(x)dx = 0$

$$\therefore I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^7 x\,dx = 0$$

Answer needs Correction? Click Here

Q25 : $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^7 x\,dx$

Answer :

Let $I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^7 x dx \qquad ...(1)$

As $\sin^7(-x) = (\sin(-x))^7 = (-\sin x)^7 = -\sin^7 x$, therefore, $\sin^2 x$ is an odd function.

It is known that, if $f(x)$ is an odd function, then $\int_{-a}^{a} f(x)dx = 0$

$$\therefore I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^7 x\,dx = 0$$

Answer needs Correction? Click Here

Q26 : $\int_0^{2\pi} \cos^5 x dx$

Answer :

Let $I = \int_0^{2\pi} \cos^5 x dx \qquad ...(1)$

$\cos^5(2\pi - x) = \cos^5 x$

It is known that,

$$\int_0^{2a} f(x)dx = 2\int_0^{a} f(x)dx, \text{ if } f(2a-x) = f(x)$$
$$= 0 \text{ if } f(2a-x) = -f(x)$$

$$\therefore I = 2\int_0^{\pi} \cos^5 x dx$$

$$\Rightarrow I = 2(0) = 0 \qquad \left[\cos^5(\pi - x) = -\cos^5 x\right]$$

Answer needs Correction? Click Here

Q27 : $\int_0^{2\pi} \cos^5 x dx$

Answer :

Let $I = \int_0^{2\pi} \cos^5 x dx \qquad ...(1)$

$\cos^5(2\pi - x) = \cos^5 x$

It is known that,

$$\int_0^{2a} f(x)dx = 2\int_0^{a} f(x)dx, \text{ if } f(2a-x) = f(x)$$
$$= 0 \text{ if } f(2a-x) = -f(x)$$

$$\therefore I = 2\int_0^{\pi} \cos^5 x dx$$

$$\Rightarrow I = 2(0) = 0 \qquad \left[\cos^5(\pi - x) = -\cos^5 x\right]$$

Answer needs Correction? Click Here

Q28 : $\int_0^{\frac{\pi}{2}} \frac{\sin x - \cos x}{1 + \sin x \cos x} dx$

Answer :

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

$$\text{Let } I = \int_0^{\frac{\pi}{2}} \frac{\sin x - \cos x}{1+\sin x \cos x} dx \qquad ...(1)$$

$$\Rightarrow I = \int_0^{\frac{\pi}{2}} \frac{\sin\left(\frac{\pi}{2}-x\right)-\cos\left(\frac{\pi}{2}-x\right)}{1+\sin\left(\frac{\pi}{2}-x\right)\cos\left(\frac{\pi}{2}-x\right)} dx \qquad \left(\int_0^a f(x)\,dx = \int_0^a f(a-x)\,dx\right)$$

$$\Rightarrow I = \int_0^{\frac{\pi}{2}} \frac{\cos x - \sin x}{1+\sin x \cos x} dx \qquad ...(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^{\frac{\pi}{2}} \frac{0}{1+\sin x\cos x} dx$$
$$\Rightarrow I = 0$$

Answer needs Correction? Click Here

Q29 : $\int_0^{\frac{\pi}{2}} \frac{\sin x - \cos x}{1+\sin x \cos x} dx$

Answer :

$$\text{Let } I = \int_0^{\frac{\pi}{2}} \frac{\sin x - \cos x}{1+\sin x \cos x} dx \qquad ...(1)$$

$$\Rightarrow I = \int_0^{\frac{\pi}{2}} \frac{\sin\left(\frac{\pi}{2}-x\right)-\cos\left(\frac{\pi}{2}-x\right)}{1+\sin\left(\frac{\pi}{2}-x\right)\cos\left(\frac{\pi}{2}-x\right)} dx \qquad \left(\int_0^a f(x)\,dx = \int_0^a f(a-x)\,dx\right)$$

$$\Rightarrow I = \int_0^{\frac{\pi}{2}} \frac{\cos x - \sin x}{1+\sin x \cos x} dx \qquad ...(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^{\frac{\pi}{2}} \frac{0}{1+\sin x\cos x} dx$$
$$\Rightarrow I = 0$$

Answer needs Correction? Click Here

Q30 : $\int_0^{\pi} \log(1+\cos x)\,dx$

Answer :

$$\text{Let } I = \int_0^{\pi} \log(1+\cos x)\,dx \qquad ...(1)$$

$$\Rightarrow I = \int_0^{\pi} \log(1+\cos(\pi - x))\,dx \qquad \left(\int_0^a f(x)\,dx = \int_0^a f(a-x)\,dx\right)$$

$$\Rightarrow I = \int_0^{\pi} \log(1-\cos x)\,dx \qquad ...(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^{\pi} \{\log(1+\cos x)+\log(1-\cos x)\}\,dx$$
$$\Rightarrow 2I = \int_0^{\pi} \log(1-\cos^2 x)\,dx$$
$$\Rightarrow 2I = \int_0^{\pi} \log \sin^2 x\,dx$$
$$\Rightarrow 2I = 2\int_0^{\pi} \log \sin x\,dx$$
$$\Rightarrow I = \int_0^{\pi} \log \sin x\,dx \qquad ...(3)$$

sin (π - x) = sin x

$$\therefore I = 2\int_0^{\frac{\pi}{2}} \log \sin x\,dx \qquad ...(4)$$

$$\Rightarrow I = 2\int_0^{\frac{\pi}{2}} \log \sin\left(\frac{\pi}{2}-x\right) dx = 2\int_0^{\frac{\pi}{2}} \log \cos x\,dx \qquad ...(5)$$

Adding (4) and (5), we obtain

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

Let $2x = t \Rightarrow 2dx = dt$

When $x = 0$, $t = 0$
and when
$\therefore$

Answer needs Correction? Click Here

Q31 : $\int_0^{\pi} \log(1+\cos x)\,dx$

Answer :

$$\text{Let } I = \int_0^{\pi} \log(1+\cos x)\,dx \qquad ...(1)$$

$$\Rightarrow I = \int_0^\pi \log\left(1+\cos\left(\pi - x\right)\right)dx \qquad \left(\int_0^a f(x)\,dx = \int_0^a f(a-x)\,dx\right)$$

$$\Rightarrow I = \int_0^\pi \log(1-\cos x)\,dx \qquad \ldots(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^\pi \left\{\log(1+\cos x)+\log(1-\cos x)\right\}dx$$

$$\Rightarrow 2I = \int_0^\pi \log\left(1-\cos^2 x\right)dx$$

$$\Rightarrow 2I = \int_0^\pi \log\sin^2 x\,dx$$

$$\Rightarrow 2I = 2\int_0^\pi \log\sin x\,dx$$

$$\Rightarrow I = \int_0^\pi \log\sin x\,dx \qquad \ldots(3)$$

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

$$\therefore I = 2\int_0^{\frac{\pi}{2}} \log\sin x\,dx \qquad \ldots(4)$$

$$\Rightarrow I = 2\int_0^{\frac{\pi}{2}} \log\sin\left(\frac{\pi}{2}-x\right)dx = 2\int_0^{\frac{\pi}{2}} \log\cos x\,dx \qquad \ldots(5)$$

Adding (4) and (5), we obtain

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

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

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

$$\Rightarrow I = \int_0^{\frac{\pi}{2}} \log\sin 2x\,dx - \int_0^{\frac{\pi}{2}} \log 2\,dx$$

Let $2x = t \Rightarrow 2dx = dt$

When $x = 0$, $t = 0$
and when
$\therefore$

Answer needs Correction? **Click Here**

Q32 : $\int_0^a \frac{\sqrt{x}}{\sqrt{x}+\sqrt{a-x}}dx$

Answer :

$$\text{Let } I = \int_0^a \frac{\sqrt{x}}{\sqrt{x}+\sqrt{a-x}}dx \qquad \ldots(1)$$

It is known that, $\left(\int_0^a f(x)\,dx = \int_0^a f(a-x)\,dx\right)$

$$I = \int_0^a \frac{\sqrt{a-x}}{\sqrt{a-x}+\sqrt{x}}dx \qquad \ldots(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^a \frac{\sqrt{x}+\sqrt{a-x}}{\sqrt{x}+\sqrt{a-x}}dx$$

$$\Rightarrow 2I = \int_0^a 1\,dx$$

$$\Rightarrow 2I = [x]_0^a$$

$$\Rightarrow 2I = a$$

$$\Rightarrow I = \frac{a}{2}$$

Answer needs Correction? **Click Here**

Q33 : $\int_0^a \frac{\sqrt{x}}{\sqrt{x}+\sqrt{a-x}}dx$

Answer :

$$\text{Let } I = \int_0^a \frac{\sqrt{x}}{\sqrt{x}+\sqrt{a-x}}dx \qquad \ldots(1)$$

It is known that, $\left(\int_0^a f(x)\,dx = \int_0^a f(a-x)\,dx\right)$

$$I = \int_0^a \frac{\sqrt{a-x}}{\sqrt{a-x}+\sqrt{x}}dx \qquad \ldots(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^a \frac{\sqrt{x}+\sqrt{a-x}}{\sqrt{x}+\sqrt{a-x}}dx$$

$$\Rightarrow 2I = \int_0^a 1\,dx$$

$$\Rightarrow 2I = [x]_0^a$$

$$\Rightarrow 2I = a$$

$$\Rightarrow I = \frac{a}{2}$$

Answer needs Correction? **Click Here**

Q34 : $\int_0^4 |x-1|dx$

Answer :

$I = \int_0^4 |x-1|dx$

It can be seen that, $(x - 1) \le 0$ when $0 \le x \le 1$ and $(x - 1) \ge 0$ when $1 \le x \le 4$

$$I = \int_0^1 |x-1|dx + \int_1^4 |x-1|dx \qquad \left(\int_a^b f(x) = \int_a^c f(x) + \int_c^b f(x)\right)$$

$$= \int_0^1 -(x-1)dx + \int_1^4 (x-1)dx$$

$$= \left[x - \frac{x^2}{2}\right]_0^1 + \left[\frac{x^2}{2} - x\right]_1^4$$

$$= 1 - \frac{1}{2} + \frac{(4)^2}{2} - 4 - \frac{1}{2} + 1$$

$$= 1 - \frac{1}{2} + 8 - 4 - \frac{1}{2} + 1$$

$$= 5$$

Q35 : $\int_0^4 |x-1|dx$

Answer :

$I = \int_0^4 |x-1|dx$

It can be seen that, $(x - 1) \le 0$ when $0 \le x \le 1$ and $(x - 1) \ge 0$ when $1 \le x \le 4$

$$I = \int_0^1 |x-1|dx + \int_1^4 |x-1|dx \qquad \left(\int_a^b f(x) = \int_a^c f(x) + \int_c^b f(x)\right)$$

$$= \int_0^1 -(x-1)dx + \int_1^4 (x-1)dx$$

$$= \left[x - \frac{x^2}{2}\right]_0^1 + \left[\frac{x^2}{2} - x\right]_1^4$$

$$= 1 - \frac{1}{2} + \frac{(4)^2}{2} - 4 - \frac{1}{2} + 1$$

$$= 1 - \frac{1}{2} + 8 - 4 - \frac{1}{2} + 1$$

$$= 5$$

Q36 : Show that $\int_0^a f(x)g(x)dx = 2\int_0^a f(x)dx$, if f and g are defined as $f(x) = f(a-x)$ and $g(x) + g(a-x) = 4$

Answer :

$$\text{Let } I = \int_0^a f(x)g(x)dx \qquad ...(1)$$

$$\Rightarrow I = \int_0^a f(a-x)g(a-x)dx \qquad \left(\int_0^a f(x)dx = \int_0^a f(a-x)dx\right)$$

$$\Rightarrow I = \int_0^a f(x)g(a-x)dx \qquad ...(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^a \{f(x)g(x) + f(x)g(a-x)\}dx$$

$$\Rightarrow 2I = \int_0^a f(x)\{g(x) + g(a-x)\}dx$$

$$\Rightarrow 2I = \int_0^a f(x) \times 4 dx \qquad [g(x) + g(a-x) = 4]$$

$$\Rightarrow I = 2\int_0^a f(x)dx$$

Q37 : Show that $\int_0^a f(x)g(x)dx = 2\int_0^a f(x)dx$, if f and g are defined as $f(x) = f(a-x)$ and $g(x) + g(a-x) = 4$

Answer :

$$\text{Let } I = \int_0^a f(x)g(x)dx \qquad ...(1)$$

$$\Rightarrow I = \int_0^a f(a-x)g(a-x)dx \qquad \left(\int_0^a f(x)dx = \int_0^a f(a-x)dx\right)$$

$$\Rightarrow I = \int_0^a f(x)g(a-x)dx \qquad ...(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^a \{f(x)g(x) + f(x)g(a-x)\}dx$$

$$\Rightarrow 2I = \int_0^a f(x)\{g(x) + g(a-x)\}dx$$

$$\Rightarrow 2I = \int_0^a f(x) \times 4 dx \qquad [g(x) + g(a-x) = 4]$$

$$\Rightarrow I = 2\int_0^a f(x)dx$$

$\Rightarrow I = 2\int_0^a f(x)dx$

Answer needs Correction? Click Here

Q38 : The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}}\left(x^3 + x\cos x + \tan^5 x + 1\right)dx$ is

A. 0

B. 2

C. π

D. 1

Answer :

Let $I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}}\left(x^3 + x\cos x + \tan^5 x + 1\right)dx$

$\Rightarrow I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} x^3 dx + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \tan^5 x dx + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 1 \cdot dx$

It is known that if *f*(*x*) is an even function, then $\int_{-a}^{a} f(x)dx = 2\int_0^a f(x)dx$ and

if *f*(*x*) is an odd function, then $\int_{-a}^{a} f(x)dx = 0$

$I = 0 + 0 + 0 + 2\int_0^{\frac{\pi}{2}} 1 \cdot dx$

$= 2[x]_0^{\frac{\pi}{2}}$

$= \frac{2\pi}{2}$

$\pi =$

Hence, the correct answer is C.

Answer needs Correction? Click Here

Q39 : The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}}\left(x^3 + x\cos x + \tan^5 x + 1\right)dx$ is

A. 0

B. 2

C. π

D. 1

Answer :

Let $I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}}\left(x^3 + x\cos x + \tan^5 x + 1\right)dx$

$\Rightarrow I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} x^3 dx + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \tan^5 x dx + \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 1 \cdot dx$

It is known that if *f*(*x*) is an even function, then $\int_{-a}^{a} f(x)dx = 2\int_0^a f(x)dx$ and

if *f*(*x*) is an odd function, then $\int_{-a}^{a} f(x)dx = 0$

$I = 0 + 0 + 0 + 2\int_0^{\frac{\pi}{2}} 1 \cdot dx$

$= 2[x]_0^{\frac{\pi}{2}}$

$= \frac{2\pi}{2}$

$\pi =$

Hence, the correct answer is C.

Answer needs Correction? Click Here

Q40 : The value of $\int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x}\right)dx$ is

A. 2

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

C. 0

D. -2

Answer :

Let $I = \int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x}\right)dx$ ...(1)

$\Rightarrow I = \int_0^{\frac{\pi}{2}} \log\left[\frac{4+3\sin\left(\frac{\pi}{2}-x\right)}{4+3\cos\left(\frac{\pi}{2}-x\right)}\right]dx$ $\left(\int_0^a f(x)dx = \int_0^a f(a-x)dx\right)$

$\Rightarrow I = \int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\cos x}{4+3\sin x}\right)dx$ ...(2)

Adding (1) and (2), we obtain

$$2I = \int_0^{\frac{\pi}{2}} \left\{ \log\left(\frac{4+3\sin x}{4+3\cos x}\right) + \log\left(\frac{4+3\cos x}{4+3\sin x}\right) \right\} dx$$

$$\Rightarrow 2I = \int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x} \times \frac{4+3\cos x}{4+3\sin x}\right) dx$$

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

$$\Rightarrow 2I = \int_0^{\frac{\pi}{2}} 0 dx$$

$$\Rightarrow I = 0$$

Hence, the correct answer is C.

Q41 : The value of $\int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x}\right) dx$ is

A. 2

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

C. 0

D. -2

Answer :

$$\text{Let } I = \int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x}\right) dx \qquad \ldots(1)$$

$$\Rightarrow I = \int_0^{\frac{\pi}{2}} \log\left[\frac{4+3\sin\left(\frac{\pi}{2}-x\right)}{4+3\cos\left(\frac{\pi}{2}-x\right)}\right] dx \qquad \left(\int_0^a f(x)dx = \int_0^a f(a-x)dx\right)$$

$$\Rightarrow I = \int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\cos x}{4+3\sin x}\right) dx \qquad \ldots(2)$$

Adding (1) and (2), we obtain

$$2I = \int_0^{\frac{\pi}{2}} \left\{ \log\left(\frac{4+3\sin x}{4+3\cos x}\right) + \log\left(\frac{4+3\cos x}{4+3\sin x}\right) \right\} dx$$

$$\Rightarrow 2I = \int_0^{\frac{\pi}{2}} \log\left(\frac{4+3\sin x}{4+3\cos x} \times \frac{4+3\cos x}{4+3\sin x}\right) dx$$

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

$$\Rightarrow 2I = \int_0^{\frac{\pi}{2}} 0 dx$$

$$\Rightarrow I = 0$$

Hence, the correct answer is C.

*********** END **********