Let $\int \frac{x^{1/2}}{\sqrt{1-x^3}}dx = \frac{2}{3} gof(x) + C$, then

$x^3 = (x^{3/2})^2$

(a) $f(x) = \sqrt{x}$

(b) $f(x) = x^{3/2}$ and $g(x) = \sin^{-1}x$

(c) $f(x) = x^{2/3}$

(d) None of these

$x^{3/2} = t$

$\frac{3}{2} \boxed{x^{1/2}.dx = dt \times \frac{2}{3}}$

$x^{1/2}$

$\Rightarrow I = \int \frac{dt \times 2/3}{\sqrt{1-t^2}} \Rightarrow \frac{2}{3} \sin^{-1}(x)^{3/2} + C$

$f(x) = x^{3/2}$

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

$$\int_{\log 1/2}^{\log 2} \sin\left\{\frac{e^x-1}{e^x+1}\right\}dx \text{ equals}$$

f(x)

(a) $\cos\frac{1}{3}$ (b) $\sin\frac{1}{2}$

(c) $2\cos 2$ (d) 0

odd function

$\Rightarrow f(-x) = \sin\left(\frac{e^{-x}-1}{e^{-x}+1}\right)$

$= \sin\left(\frac{\frac{1}{e^x}-1}{\frac{1}{e^x}+1}\right) = \sin\boxed{\frac{1-e^x}{1+e^x}} = -\boxed{\sin\left(\frac{e^x-1}{1+e^x}\right)}$

$\boxed{f(-x) = -f(x)} \Rightarrow I = 0$ ✓

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Evaluate: $\displaystyle\int_0^{\pi/2} \frac{\cos x}{\left(\cos\frac{x}{2}+\sin\frac{x}{2}\right)^3}dx$

(a) $2-\sqrt{2}$ (b) $2+\sqrt{2}$

(c) $3+\sqrt{3}$ (d) $3-\sqrt{3}$

$\cos^2$

$\cos 2\theta = \cos^2\theta - \sin^2\theta$ ($\theta/2$)

$\cos\frac{x}{2}+\sin\frac{x}{2} = t$

$x=0 \Rightarrow \boxed{t=1} \Rightarrow x=\frac{\pi}{2} \Rightarrow t=\sqrt{2}$

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

$\Rightarrow \int\frac{1}{t^2}\cdot 2dt = 2\frac{t^{-2+1}}{-2+1} = -\frac{2}{t} = \boxed{\frac{-2}{\cos\frac{x}{2}+\sin\frac{x}{2}}}$

$\int_1^{\sqrt{2}}\left[-2/t\right]_1^{\sqrt{2}} = -2\left[\frac{1}{\sqrt{2}}-\frac{1}{1}\right]$

$-\frac{2}{\sqrt{2}}+2$

$2-\sqrt{2}$

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

The value of integral, $\int_3^6 \frac{\sqrt{x}}{\sqrt{9-x}+\sqrt{x}}\,dx$ is

(a) 1/2 (b) 3/2

(c) 2 (d) 1

$\to \int_3^6 \frac{\sqrt{9-x}}{\sqrt{9-(9-x)}+\sqrt{9-x}} = \int_3^6 \frac{\sqrt{9-x}+\sqrt{x}}{\sqrt{x}+\sqrt{9-x}}$

$I = [x]_3^6$

$6-3 = \frac{3}{2}$

$$\int \frac{\sqrt{x}}{\sqrt{a^3 - x^3}}\,dx \text{ equal to}$$

$a^3 = (a^{3/2})^2$

$x^3 = (x^{3/2})^2$

(a) $\frac{1}{3}\sin^{-1}\sqrt{\frac{x^3}{a^3}} + C$ (b) $\frac{2}{3}\sin^{-1}\sqrt{\frac{x^3}{a^3}} + C$

(c) $\frac{2}{3}\sin^{-1}\sqrt{\frac{x}{a}} + C$ (d) None of these

$\Rightarrow$ Let $(x^{3/2})^2 \Rightarrow x^{3/2} = t \Rightarrow \frac{3}{2}\boxed{x^{1/2}dx} = dt \times \frac{2}{3}$

$$\frac{2}{3}\left[\int \frac{dt}{\sqrt{(a^{3/2})^2 - t^2}}\right] \rightarrow \frac{2}{3}\left[\sin^{-1}\frac{x^{3/2}}{a^{3/2}}\right]$$

If $\int \sin^3 x \cos^5 x\,dx = A\sin^4 x + B\sin^6 x + C\sin^8 x + D$. Then

(a) $A = \frac{1}{4},\ B = -\frac{1}{3},\ C = \frac{1}{8},\ D \in R$

(b) $A = \frac{1}{8},\ B = \frac{1}{4},\ C = \frac{1}{3},\ D \in R$

(c) $A = 0,\ B = -\frac{1}{6},\ C = \frac{1}{8},\ D \in R$

(d) None of these.

$\int \sin^3 x \cos^4 x \cdot \cos x\,dx$

$\sin x = t \to \cos x\,dx = dt$

$A = 1/4$ $\quad C = 1/8$ $\quad B = -1/3$

$\cos^4 x$

$(\cos^2 x)^2$

$(1-\sin^2 x)^2$

$(1-t^2)^2$

$\boxed{1+t^4-2t^2}$

$\int t^3 \cdot (1+t^4-2t^2)$

$\frac{t^{3+1}}{4} + \frac{t^{7+1}}{8} - 2\cdot\frac{t^{5+1}}{6} = \frac{\sin^4 x}{4} + \frac{\sin^8 x}{8} - \frac{\sin^6 x}{3}$

Value of $\int_0^4 \frac{1}{\sqrt{x^2+2x+3}}\,dx$ is → Completing

(a) $\log\left(\frac{1+\sqrt{3}}{5+3\sqrt{3}}\right)$ (b) $\log\left(\frac{5-3\sqrt{3}}{1-\sqrt{3}}\right)$

(c) $\log\left(\frac{5+3\sqrt{3}}{1+\sqrt{3}}\right)$ (d) None of these

$(x^2 + 2\times x\times 1 + (1)^2 - (1)^2 + 3$

$\underbrace{(x+1)^2}_{t} + (\sqrt{2})^2 + (\sqrt{2})^2$

Consider the following statements

Statement-I :

The value of $\int_0^1 \frac{x^4(1-x)^4}{1+x^2}\,dx$ is $\frac{22}{7}-\pi$.

$$\int_0^1 \frac{(x^4-1)(1-x)^4 + (1-x)^4}{1+x^2}$$

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

Statement-II :

The value of integral $\int_{-1}^{1} \frac{|x+2|}{x+2}\,dx$ is 2.

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

$$\int_0^1 (x^2-1)((1-x)^2)^2 + 1 +$$

(a) Statement I is true

(b) Statement II is true

(c) Both statements are true

(d) Both statements are false

$$2\int_0^{2\pi} \log\left(\frac{a+b\sec x}{a-b\sec x}\right)dx = 2\int_0^{\pi} \log\left(\frac{a+b\sec x}{a-b\sec x}\right)$$

$\sec(2\pi - x)$ $\sec x$

(a) 0 (b) $\pi/2$

(c) $\dfrac{\pi(a+b)}{a-b}$ (d) $\dfrac{\pi}{2}(a^2 - b^2)$

$$2\left[\int_0^{\pi} \log(a+b\sec x) - \boxed{\int_0^{\pi} \log(a-b\sec x)}\right]$$

①

$$-\int_0^{\pi} \log[a-b\sec(\pi-x)]$$

$$-\int_0^{\pi} \log[a+b\sec x]$$

0

If m is an integer, then $I = \int_0^\pi \frac{\sin(2mx)}{\sin x}dx$ is equal to :

(a) 1 (b) 2

(c) 0 (d) π

$\sin A \cos B + \cos A \sin B$

$\sin(2m\pi - 2mx)$

$\sin 2m\pi \cos 2mx - \cos 2m\pi \cdot \sin 2mx$

$\sin 2\pi \cdot \cos 2x - \cos 2\pi \cdot \sin 2x$

$0 - \sin 2x$

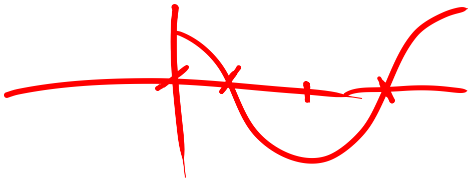
$-\sin 2mx$

$\int_0^\pi \frac{\sin(2m(\pi - x))}{\sin(\pi - x)}$

$\int_0^\pi \frac{\sin 2m\pi - \sin 2mx}{\sin x} = \int_0^\pi \frac{-\sin 2mx}{\sin x}$

$I = -I \Rightarrow 2I = 0$

$I = 0$



1	2	3	4	5	6	7	8	9	10
B	D	A	B	B	A	C	C	A	C