**Evaluate** $I=\int \frac{dx}{\sqrt{4-9x^2}}$

**Solution :-** $I=\int \frac{dx}{\sqrt{4-(3x)^2}}$ **Let** $u=3x \Rightarrow du=3dx \Rightarrow dx=\frac{du}{3}$

$$\Rightarrow I=\int \frac{1}{\sqrt{2^2-u^2}}\frac{du}{3}=\frac{1}{3}\int \frac{1}{\sqrt{a^2-u^2}}du=\frac{1}{3}\sin^{-1}(\frac{u}{a})+c=\frac{1}{3}\sin^{-1}(\frac{u}{2})+c=\frac{1}{3}\sin^{-1}(\frac{3x}{2})+c$$

**Evaluate** $I=\int \frac{\cos(x)dx}{\sin^2(x)}$ **Let** $u=\sin(x) \Rightarrow du=\cos(x)dx \Rightarrow dx=\frac{du}{\cos(x)}$

**Solution** $I=\int \frac{\cos(x)dx}{\sin^2(x)}=\int \frac{\cos(x)}{u^2}\frac{du}{\cos(x)}=\int u^{-2}du=\frac{u^{-2+1}}{-2+1}+c$

**Evaluate** $I=\int \tan^3(3x)3\sec^2(3x)dx$

**Solution :-** **Let** $u=\tan(3x) \Rightarrow du=3\sec^2(3x)dx \Rightarrow dx=\frac{du}{3\sec^2(3x)}$

$$I=\int \tan^3(3x)3\sec^2(3x)dx$$

$$\Rightarrow I=\int u^3 3\sec^2(3x)\frac{du}{3\sec^2(3x)}=\int u^3du=\frac{u^4}{4}+c=\frac{1}{4}[\tan(3x)]^4+c$$

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

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

$$\Rightarrow \int [1-\cos(2x)]dx = x - \frac{1}{2}\sin(2x) + c$$

**Evaluate** $I = \int \frac{\sqrt{x}}{4+x^3}\,dx$

**Solution :-** $I = \int \frac{\sqrt{x}}{4+\left((x)^{\frac{3}{2}}\right)^2}\,dx$ **Let** $u = x^{\frac{3}{2}} \Rightarrow du = \frac{3}{2}x^{\frac{1}{2}}dx = \frac{3}{2}\sqrt{x}\ dx$

$$\Rightarrow dx = \frac{du}{\frac{3}{2}\sqrt{x}}$$

$$\Rightarrow \int \frac{\sqrt{x}}{2^2+(u)^2}\frac{du}{\frac{3}{2}\sqrt{x}} = \frac{2}{3}\int \frac{du}{a^2+(u)^2} = \frac{2}{3}\frac{1}{2}\tan^{-1}(\frac{u}{2}) = \frac{1}{3}\tan^{-1}(\frac{x^{3/2}}{2}) + c$$

**Evaluate** $I = \int \sec^2(x)dx$

**Solution :-** $\Rightarrow \ I = \int \sec^2(x)dx = \tan(x) + c$

**Evaluate** $I = \int \frac{\sin^{-1}(x)}{\sqrt{1-x^2}}dx$

**Solution :-** **Let** $u = \sin^{-1}(x) \ \Rightarrow \ du = \frac{1}{\sqrt{1-x^2}}dx \ \Rightarrow \ dx = \sqrt{1-x^2}\,du$

$$I = \int \frac{\sin^{-1}(x)}{\sqrt{1-x^2}}dx = \int \frac{u}{\sqrt{1-x^2}}\sqrt{1-x^2}\,du \Rightarrow I\int u\,du = \frac{u^2}{2} + c = \frac{[\sin^{-1}(x)]^2}{2} + c$$



**Evaluate** $I = \int \frac{e^x}{1+e^{2x}}dx \ \Rightarrow \int \frac{e^x}{1+(e^x)^2}dx$

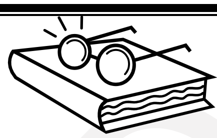
**Solution :-** **Let** $u = e^x \Rightarrow du = e^x dx \Rightarrow dx = \dfrac{du}{e^x}$

$$I = \int \frac{e^x}{1+(e^x)^2} dx = \int \frac{e^x}{1+(u)^2} \frac{du}{e^x} \Rightarrow I = \int \frac{du}{1+u^2} = \tan^{-1}(u) + c = \tan^{-1}(e^x) + c$$

**Evaluate** $I = \int \dfrac{[\ln(x)]^2}{x} dx$

**Solution :-** **Let** $u = \ln(x) \Rightarrow du = \dfrac{1}{x} dx \Rightarrow dx = x du$

$$I = \int \frac{[u]^2}{x} x dx = \int u^2 du \Rightarrow I = \frac{u^3}{3} = \frac{[\ln(x)]^3}{3} + c$$



**How To Solve**

| | | | | |
|---|---|---|---|---|
| 1 | $\int (x - \frac{1}{x})^2$ | $\int x.2^{x^2+3} dx$ | $\int \dfrac{\sec^2(x)}{1+\tan^2(x)} dx$ | $\int \dfrac{e^x}{1+e^{2x}} dx$ |
| 2 | $\int \tan^2(3x) dx$ | $\int \tan(4x) dx$ | $\int \dfrac{dx}{x[1+(\ln(x))^2]}$ | $\int \dfrac{[\ln(x)]^3}{x}$ |

| | | | | |
|---|---|---|---|---|
| **3** | $\int \frac{\sec^2[\ln(x)]}{x}dx$ | $\int \frac{2\sin(\sqrt{x})}{\sqrt{x}\sec(\sqrt{x})}dx$ | $\int \frac{dx}{\sqrt{x}(1+x)}$ | $\int \sin^2(x)dx$ |
| **4** | $\int_4^9 \frac{dx}{x-\sqrt{x}}$ | $\int_0^{\pi} \sin^3(x)\cos(x)dx$ | $\int_0^{\infty} e^{-x-e^{-x}}dx$ | $\int \tan(x)\frac{\ln[\cos(x)]}{2}dx$ |