



Indefinite Integrals Ex 19.13 Q6

$$\text{Let } I = \int \frac{x}{\sqrt{4-x^4}} dx$$

$$\text{Let } x^2 = t$$

$$\Rightarrow 2x dx = dt$$

$$\Rightarrow x dx = \frac{dt}{2}$$

$$I = \frac{1}{2} \int \frac{dt}{\sqrt{(2)^2 - t^2}}$$

$$= \frac{1}{2} \sin^{-1} \left( \frac{t}{2} \right) + c \quad \left[ \text{Since } \int \frac{1}{\sqrt{a^2 - x^2}} dx = \sin^{-1} \left( \frac{x}{a} \right) + c \right]$$

$$I = \frac{1}{2} \sin^{-1} \left( \frac{x^2}{2} \right) + c$$

Indefinite Integrals Ex 19.13 Q7

$$\text{Let } I = \int \frac{1}{x \sqrt{4-9(\log x)^2}} dx$$

$$\text{Let } 3 \log x = t$$

$$\Rightarrow \frac{3}{x} dx = dt$$

$$\Rightarrow \frac{1}{x} dx = \frac{dt}{3}$$

$$I = \frac{1}{3} \int \frac{dt}{\sqrt{(2)^2 - t^2}}$$

$$= \frac{1}{3} \sin^{-1} \left( \frac{t}{2} \right) + c \quad \left[ \text{Since } \int \frac{1}{\sqrt{a^2 - x^2}} dx = \sin^{-1} \left( \frac{x}{a} \right) + c \right]$$

$$I = \frac{1}{3} \sin^{-1} \left( \frac{3 \log x}{2} \right) + c$$

Indefinite Integrals Ex 19.13 Q8

$$\text{Let } I = \int \frac{\sin 8x}{\sqrt{9 + (\sin 4x)^4}} dx$$

$$\text{Let } \sin^2 4x = t$$

$$\Rightarrow 2 \sin 4x \cdot \cos 4x (4) dx = dt$$

$$\Rightarrow 4 \sin 8x dx = dt$$

$$\Rightarrow \sin 8x dx = \frac{dt}{4}$$

$$I = \frac{1}{4} \int \frac{dt}{\sqrt{(3)^2 + t^2}}$$

$$= \frac{1}{4} \log \left| t + \sqrt{(3)^2 + t^2} \right| + c \quad \left[ \text{Since } \int \frac{1}{\sqrt{a^2 + x^2}} dx = \log \left| x + \sqrt{a^2 + x^2} \right| + c \right]$$

$$I = \frac{1}{4} \log \left| \sin^2 4x + \sqrt{9 + \sin^4 4x} \right| + c$$

Indefinite Integrals Ex 19.13 Q9

$$\text{Let } I = \int \frac{\cos 2x}{\sqrt{\sin^2 2x + 8}} dx$$

$$\text{Let } \sin 2x = t$$

$$\Rightarrow 2 \cos 2x dx = dt$$

$$\Rightarrow \cos 2x dx = \frac{dt}{2}$$

$$I = \frac{1}{2} \int \frac{dt}{\sqrt{t^2 + (2\sqrt{2})^2}}$$

$$= \frac{1}{2} \log \left| t + \sqrt{t^2 + (2\sqrt{2})^2} \right| + c \quad \left[ \text{Since } \int \frac{1}{\sqrt{a^2 + x^2}} dx = \log \left| x + \sqrt{x^2 + a^2} \right| + c \right]$$

$$I = \frac{1}{2} \log \left| \sin 2x + \sqrt{\sin^2 2x + 8} \right| + c$$

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