



Exercise 7.2 : Solutions of Questions on Page Number : 304

Q1 : $\frac{2x}{1+x^2}$

Answer :

Let $1+x^2 = t$

$\therefore 2x \, dx = dt$

$\Rightarrow \int \frac{2x}{1+x^2} \, dx = \int \frac{1}{t} \, dt$

$= \log|t| + C$

$= \log|1+x^2| + C$

$= \log(1+x^2) + C$

Answer needs Correction? [Click Here](#)

Q2 : $\frac{(\log x)^2}{x}$

Answer :

Let $\log |x| = t$

$\therefore \frac{1}{x} \, dx = dt$

$\Rightarrow \int \frac{(\log |x|)^2}{x} \, dx = \int t^2 \, dt$

$= \frac{t^3}{3} + C$

$= \frac{(\log |x|)^3}{3} + C$

Answer needs Correction? [Click Here](#)

Q3 : $\frac{1}{x+x \log x}$

Answer :

$\frac{1}{x+x \log x} = \frac{1}{x(1+\log x)}$

Let $1+\log x = t$

$\therefore \frac{1}{x} \, dx = dt$

$\Rightarrow \int \frac{1}{x(1+\log x)} \, dx = \int \frac{1}{t} \, dt$

$= \log|t| + C$

$= \log|1+\log x| + C$

Answer needs Correction? [Click Here](#)

Q4 : $\sin x \int \sin(\cos x) \, dx$

Answer :

$\sin x \int \sin(\cos x) \, dx$

Let $\cos x = t$

$\therefore -\sin x \, dx = dt$

$\Rightarrow \int \sin x \cdot \sin(\cos x) \, dx = - \int \sin t \, dt$

$= -[-\cos t] + C$

$= \cos t + C$

$= \cos(\cos x) + C$

Answer needs Correction? [Click Here](#)

Q5 : $\sin(ax+b)\cos(ax+b)$

Answer :

$$\sin(ax+b)\cos(ax+b) = \frac{2\sin(ax+b)\cos(ax+b)}{2} = \frac{\sin 2(ax+b)}{2}$$

$$\text{Let } 2(ax+b) = t$$

$$\therefore 2a dx = dt$$

$$\begin{aligned}\Rightarrow \int \frac{\sin 2(ax+b)}{2} dx &= \frac{1}{2} \int \frac{\sin t}{2a} dt \\ &= \frac{1}{4a} [-\cos t] + C \\ &= \frac{-1}{4a} \cos 2(ax+b) + C\end{aligned}$$

Answer needs Correction? [Click Here](#)

Q6 : $\sqrt{ax+b}$

Answer :

$$\text{Let } ax+b = t$$

$$\Rightarrow a dx = dt$$

$$\therefore dx = \frac{1}{a} dt$$

$$\Rightarrow \int (ax+b)^{\frac{1}{2}} dx = \frac{1}{a} \int t^{\frac{1}{2}} dt$$

$$\begin{aligned}&= \frac{1}{a} \left(\frac{t^{\frac{3}{2}}}{\frac{3}{2}} \right) + C \\ &= \frac{2}{3a} (ax+b)^{\frac{3}{2}} + C\end{aligned}$$

Answer needs Correction? [Click Here](#)

Q7 : $x\sqrt{x+2}$

Answer :

$$\text{Let } (x+2) = t$$

$$\therefore dx = dt$$

$$\begin{aligned}\Rightarrow \int x\sqrt{x+2} dx &= \int (t-2)\sqrt{t} dt \\ &= \int \left(t^{\frac{3}{2}} - 2t^{\frac{1}{2}} \right) dt \\ &= \int t^{\frac{3}{2}} dt - 2 \int t^{\frac{1}{2}} dt \\ &= \frac{t^{\frac{5}{2}}}{\frac{5}{2}} - 2 \left(\frac{t^{\frac{3}{2}}}{\frac{3}{2}} \right) + C \\ &= \frac{2}{5} t^{\frac{5}{2}} - \frac{4}{3} t^{\frac{3}{2}} + C \\ &= \frac{2}{5} (x+2)^{\frac{5}{2}} - \frac{4}{3} (x+2)^{\frac{3}{2}} + C\end{aligned}$$

Answer needs Correction? [Click Here](#)

Q8 : $x\sqrt{1+2x^2}$

Answer :

$$\text{Let } 1+2x^2 = t$$

$$\therefore 4x dx = dt$$

$$\begin{aligned}\Rightarrow \int x\sqrt{1+2x^2} dx &= \int \frac{\sqrt{t} dt}{4} \\ &= \frac{1}{4} \int t^{\frac{1}{2}} dt \\ &= \frac{1}{4} \left(\frac{t^{\frac{3}{2}}}{\frac{3}{2}} \right) + C \\ &= \frac{1}{6} (1+2x^2)^{\frac{3}{2}} + C\end{aligned}$$

Answer needs Correction? [Click Here](#)

Q9 : $(4x+2)\sqrt{x^2+x+1}$

Answer :

$$\text{Let } x^2+x+1 = t$$

$$\therefore (2x+1) dx = dt$$

$$\begin{aligned}
 & \int (4x+2)\sqrt{x^2+x+1} \, dx \\
 &= \int 2\sqrt{t} \, dt \\
 &= 2 \int \sqrt{t} \, dt \\
 &= 2 \left(\frac{t^{\frac{3}{2}}}{\frac{3}{2}} \right) + C \\
 &= \frac{4}{3} (x^2+x+1)^{\frac{3}{2}} + C
 \end{aligned}$$

Answer needs Correction? [Click Here](#)

Q10: $\frac{1}{x-\sqrt{x}}$

Answer :

$$\frac{1}{x-\sqrt{x}} = \frac{1}{\sqrt{x}(\sqrt{x}-1)}$$

Let $(\sqrt{x}-1)=t$

$$\therefore \frac{1}{2\sqrt{x}} dx = dt$$

$$\Rightarrow \int \frac{1}{\sqrt{x}(\sqrt{x}-1)} dx = \int \frac{2}{t} dt$$

$$= 2 \log |t| + C$$

$$= 2 \log |\sqrt{x}-1| + C$$

Answer needs Correction? [Click Here](#)

Q11: $\frac{x}{\sqrt{x+4}}, x > 0$

Answer :

Let $x+4=t$

$$\therefore dx = dt$$

***** END *****