



Indefinite Integrals Ex 19.1 Q1

(i)

$$\begin{aligned}\int x^4 dx &= \frac{x^{4+1}}{4+1} + C \\ &= \frac{x^5}{5} + C\end{aligned}$$

(ii)

$$\begin{aligned}\int x^{\frac{5}{4}} dx &= \frac{x^{\frac{5}{4}+1}}{\frac{5}{4}+1} + C \\ &= \frac{x^{\frac{5+4}{4}}}{\frac{5+4}{4}} + C \\ &= \frac{4x^{\frac{9}{4}}}{9} + C\end{aligned}$$

(iii)

$$\begin{aligned}\int \frac{1}{x^5} dx &= \int x^{-5} dx \\ &= \frac{x^{-5+1}}{-5+1} + C \\ &= \frac{x^{-4}}{-4} + C \\ &= \frac{-1}{4x^4} + C\end{aligned}$$

(iv)

$$\begin{aligned}\int \frac{1}{x^{\frac{3}{2}}} dx &= \int x^{-\frac{3}{2}} dx \\&= \int x^{-\frac{3}{2}} dx \\&= \frac{x^{-\frac{3}{2}+1}}{-\frac{3}{2}+1} + C \\&= \frac{x^{-\frac{1}{2}}}{-\frac{1}{2}} + C \\&= -2 \times \frac{1}{\sqrt{x}} + C \\&= \frac{-2}{\sqrt{x}} + C\end{aligned}$$

(v)

$$\int 3^x dx = \frac{3^x}{\log 3} + C$$

$$\left[\because \int a^x dx = \frac{a^x}{\log a} + C \right]$$

(vi)

$$\begin{aligned}\int \frac{1}{\sqrt[3]{x^2}} dx &= \int \frac{1}{x^{\frac{2}{3}}} dx \\&= \int x^{-\frac{2}{3}} dx \\&= \frac{x^{-\frac{2}{3}+1}}{-\frac{2}{3}+1} + C \\&= \frac{x^{\frac{1}{3}}}{\frac{1}{3}} + C \\&= 3\sqrt[3]{x} + C\end{aligned}$$

(vii)

$$\begin{aligned}\int 3^{2\log_3 x} dx &= \int 3^{\log_3 x^2} dx \\&= \int x^2 dx \\&= \frac{x^3}{3} + C\end{aligned}$$

$$\left[\because a^{\log_a x} = x \right]$$

(viii)

$$\begin{aligned}\int \log_x x dx &= \int 1 dx \\&= x + C.\end{aligned}$$

***** END *****