

Q2 | log | xx

Class-XII^{sc} (MATHS)

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Integrate \Rightarrow

(a)
$$\int \frac{1}{x - \sqrt{x}} dx$$

$$\int \frac{dx}{\sqrt{x}(\sqrt{x}-1)}$$

Let $\sqrt{x} = t \quad \therefore \frac{dt}{dx} = \frac{1}{2\sqrt{x}} \Rightarrow dt = \frac{dx}{2\sqrt{x}}$

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

$\Rightarrow \log(t-1) + C \quad \therefore \log|\sqrt{x}-1| + C$

(b)
$$\int \frac{x}{\sqrt{x+4}} dx$$

Let $x+4 = t \quad \therefore \frac{dt}{dx} = 1$
 $\int dt = dx$

$$\int \frac{t-4}{\sqrt{t}} dt = \int \sqrt{t} dt - \int 4t^{-1/2} dt$$

$$\int t^{1/2} dt - 4 \int t^{-1/2} dt$$

$$\frac{2t^{3/2}}{3} - 2 \times 4 t^{1/2} = \frac{2}{3}(x+4)^{3/2} - 8\sqrt{x+4}$$

(c) $\int e^{2x+3} dx$

Let $2x+3 = t \quad \therefore \frac{dt}{dx} = 2$

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

$\frac{1}{2} \int e^t dt \Rightarrow \frac{1}{2} e^t + C$

$\Rightarrow \frac{1}{2} e^{2x+3} + C$

(d) $\int \frac{1}{x(\log x)^m} dx$

Let $\log x = t \quad \therefore \frac{dt}{dx} = \frac{1}{x} \Rightarrow \frac{dx}{x} = dt$

$\int \frac{dt}{t^m} \Rightarrow \int t^{-m} dt \Rightarrow$

$\frac{t^{-m+1}}{-m+1} + C \quad \left(\frac{1}{-m+1} \right) \quad \frac{1}{-m+1}$

$\frac{1}{1-m} \times \frac{1}{t^{-m+1}} + C$

$\frac{1}{1-m} \times \frac{1}{(\log x)^{-m+1}} + C$

Solve Ex 7-2