9) $\int \sin x \, dx = -\cos x + C$

10) $\int \cos x \, dx = \sin x + C$

11) $\int \sec^2 x \, dx = \tan x + C$

12) $\int \operatorname{cosec}^2 x \, dx = -\cot x + C$

13) $\int \sec x \cdot \tan x \, dx = \sec x + C$

14) $\int \operatorname{cosec} x \cdot \cot x \, dx = -\operatorname{cosec} x + C$

Ex: Integrate the following functions w.r.t.s

(i) $4 + \frac{3}{7}x - 6x^2$

$= \int (4 + 3/7\, x - 6x^2)\, dx$

$= \int 4\, dx + \int \frac{3}{7} x \, dx - \int 6x^2 \, dx$

$= 4\int 1\, dx + \frac{3}{7}\int x^1 dx - 6\int x^2 dx$

$= 4x + \frac{3}{7} \cdot \frac{x^{1+1}}{1+1} - 6\,\frac{x^{2+1}}{2+1} + C$

$= 4x + \frac{3}{7} \cdot \frac{x^2}{2} - 6\,\frac{x^3}{3} + C$

$= 4x + \frac{3x^2}{14} - 2x^3 + C$

2) $\frac{-5}{9\sqrt[4]{x^3}}$

$= \int \frac{-5}{9\sqrt[4]{x^3}}\, dx = -\frac{5}{9}\int \frac{1}{(x^3)^{1/4}}\, dx$

$= -\frac{5}{9}\int x^{-3/4}\, dx$

$= -\frac{5}{9}\,\frac{x^{\frac{-3}{4}+1}}{\frac{-3}{4}+1} + C$

$$= -\frac{5}{9}\frac{x^{\frac{-3+4}{4}}}{\frac{-3+4}{4}} + c = \frac{-5}{9}\frac{x^{1/4}}{\frac{1}{4}} + c$$

$$= -\frac{5 \cdot 4}{9} x^{1/4} + c = \frac{-20}{9} x^{1/4} + c$$

3) $2x - 3\cos x + e^x$

4) $\sec x (\sec x + \tan x)$

$$= \int \sec x (\sec x + \tan x)\, dx$$

$$= \int [(\sec x)(\sec x) + (\sec x \cdot \tan x)]\, dx$$

$$= \int \sec^2 x \cdot dx + \int \sec x \cdot \tan x\, dx$$

$$= \tan x + \sec x + c$$

5) $\int \left(x + \frac{1}{\sqrt{x}}\right)^2 dx$

$$= \int x^2 + 2 \cdot x \cdot \frac{1}{\sqrt{x}} + \left(\frac{1}{\sqrt{x}}\right)^2 dx$$

$$= \int x^2\, dx + \int 2 \cdot x \cdot \frac{1}{x^{1/2}}\, dx + \int \frac{1}{x}\, dx$$

$$= \frac{x^{2+1}}{2+1} + 2\int x^{1-1/2}\, dx + \log x + c$$

$$= \frac{x^3}{3} + 2\int x^{-1/2}\,dx + \log x + C$$

$$= \frac{x^3}{3} + 2 \cdot \frac{x^{\frac{-1}{2}+1}}{\frac{-1}{2}+1} + \log x + C$$

$$= \frac{x^3}{3} + 2 \cdot \frac{x^{\frac{1}{2}}}{\frac{1}{2}} + \log x + C$$

$$= \frac{x^3}{3} + 4 \cdot x^{1/2} + \log x + C$$

6) $\int (8x^2 + 3)\,dx$

7) $\int \sqrt{x}\,(1+x)\,dx$

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

9) $\int \left(\frac{2+x}{x}\right) dx$

7) $= \int (\sqrt{x} + \sqrt{x} \cdot x)\,dx$

$= \int x^{1/2} + x^{1/2} \cdot x^1\,dx$

$= \int x^{1/2} + x^{\frac{1}{2}+1}\,dx$

$= \int x^{1/2}\,dx + \int x^{3/2}\,dx$

Date: / /
Page No.

$$= \frac{x^{1/2+1}}{1/2+1} + \frac{x^{3/2+1}}{3/2+1} + C$$

$$= \frac{x^{3/2}}{3/2} + \frac{x^{5/2}}{5/2} + C = \frac{2x^{3/2}}{3} + \frac{2x^{5/2}}{5} + C$$

9) $$= \int \left(\frac{2}{x} + \frac{x}{x}\right) dx$$

$$= 2\int \frac{1}{x}\, dx + \int 1\, dx$$

$$= 2 \log x + x + C$$