



Indefinite Integrals Ex 19.28 Q6

$$\text{Let } I = \int e^x \sqrt{e^{2x} + 1} dx$$

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

$$\Rightarrow e^x dx = dt$$

$$\begin{aligned} \therefore I &= \int \sqrt{t^2 + 1^2} dt \\ &= \frac{t}{2} \sqrt{t^2 + 1} + \frac{1}{2} \log |t + \sqrt{t^2 + 1}| + c \end{aligned}$$

$$\therefore I = \frac{e^x}{2} \sqrt{e^{2x} + 1} + \frac{1}{2} \log |e^x + \sqrt{e^{2x} + 1}| + c$$

Indefinite Integrals Ex 19.28 Q7

$$\text{Let } I = \int \sqrt{3^2 - x^2}$$

We know that,

$$\int \sqrt{a^2 - x^2} = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + c$$

$$\therefore I = \frac{x}{2} \sqrt{9 - x^2} + \frac{9}{2} \sin^{-1} \frac{x}{3} + c$$

Indefinite Integrals Ex 19.28 Q8

$$\text{Let } I = \int \sqrt{16x^2 + 25} dx$$

$$\begin{aligned} &= \int \sqrt{(4x)^2 + 5^2} dx \\ &= 4 \int \sqrt{x^2 + \left(\frac{5}{4}\right)^2} dx \\ &= 4 \left\{ \frac{x}{2} \sqrt{x^2 + \left(\frac{5}{4}\right)^2} + \frac{\left(\frac{5}{4}\right)^2}{2} \log \left| x + \sqrt{x^2 + \left(\frac{5}{4}\right)^2} \right| + c \right\} \\ \therefore I &= 2x \sqrt{x^2 + \frac{25}{16}} + \frac{25}{8} \log \left| x + \sqrt{x^2 + \frac{25}{16}} \right| + c \end{aligned}$$

Indefinite Integrals Ex 19.28 Q9

$$\text{Let } I = \int \sqrt{4x^2 - 5} dx$$

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

$$= 2 \left\{ \frac{x}{2} \sqrt{x^2 - \frac{5}{4}} - \frac{5}{8} \log \left| x + \sqrt{x^2 - \frac{5}{4}} \right| + c \right.$$

$$\therefore I = x \sqrt{x^2 - \frac{5}{4}} - \frac{5}{4} \log \left| x + \sqrt{x^2 - \frac{5}{4}} \right| + c$$

Indefinite Integrals Ex 19.28 Q10

$$\text{Let } I = \int \sqrt{2x^2 + 3x + 4} dx$$

$$= \sqrt{2} \int \sqrt{x^2 + \frac{3}{2}x + 2} dx$$

$$= \sqrt{2} \int \sqrt{x^2 + \frac{3}{2}x + \frac{9}{16} + \frac{23}{16}} dx$$

$$= \sqrt{2} \int \sqrt{\left(x + \frac{3}{4}\right)^2 + \left(\frac{\sqrt{23}}{4}\right)^2} dx$$

$$= \sqrt{2} \left\{ \frac{\left(x + \frac{3}{4}\right)}{2} \sqrt{x^2 + \frac{3}{2}x + 2} + \frac{23}{32} \cdot \log \left| \left(x + \frac{3}{4}\right) + \sqrt{x^2 + \frac{3}{2}x + 2} \right| + c \right\}$$

$$\therefore I = \frac{4x+3}{8} \sqrt{2x^2 + 3x + 4} + \frac{23\sqrt{2}}{32} \cdot \log \left| \left(x + \frac{3}{4}\right) + \sqrt{x^2 + \frac{3}{2}x + 2} \right| + c$$

Indefinite Integrals Ex 19.28 Q11

$$\text{Let } I = \int \sqrt{3 - 2x - 2x^2} dx$$

$$= \sqrt{2} \int \sqrt{\frac{3}{2} - x - x^2} dx$$

$$= \sqrt{2} \int \sqrt{\frac{7}{4} - \left(\frac{1}{4} + x + x^2\right)} dx \quad \left[\text{Adding and subtracting } \frac{1}{4} \right]$$

$$= \sqrt{2} \int \sqrt{\left(\frac{\sqrt{7}}{2}\right)^2 - \left(x + \frac{1}{2}\right)^2} dx$$

$$= \sqrt{2} \left\{ \frac{x + \frac{1}{2}}{2} \sqrt{\frac{3}{2} - x - x^2} + \frac{7}{8} \sin^{-1} \left(\frac{x + \frac{1}{2}}{\frac{\sqrt{7}}{2}} \right) + c \right.$$

$$\therefore I = \frac{2x+1}{4} \sqrt{3 - 2x - 2x^2} + \frac{7\sqrt{2}}{8} \sin^{-1} \left(\frac{2x+1}{\sqrt{7}} \right) + c$$

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