Indefinite Integrals Ex 19.4 Q4

Let $I = \int \frac{2x+3}{(x-1)^2} dx$. Then,

$$I = \int \frac{2x+2-2+3}{(x-1)^2} \times dx$$

$$= \int \frac{2x-2+5}{(x-1)^2} \times dx$$

$$= 2\int \frac{(x-1)}{(x-1)^2} \times dx + 5\int \frac{1}{(x-1)^2} dx$$

$$= 2\int \frac{1}{x-1} \times dx + 5\int (x-1)^{-2} \times dx$$

$$= 2\log|x-1| + 5 \times \frac{(x-1)^{-1}}{-1} + c$$

$$= 2\log|x-1| - \frac{5}{x-1} + c$$

$\therefore \quad I = 2\log|x-1| - \frac{5}{x-1} + c.$

Indefinite Integrals Ex 19.4 Q5

Let $I = \int \frac{x^2 + 3x - 1}{(x+1)^2} dx$. Then,

$$I = \int \frac{x^2 + x + 2x - 1}{(x+1)^2} dx$$

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

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

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

$$= \int \frac{x+1-1}{x+1} dx + \int \frac{2(x+1) - 3}{(x+1)^2} dx$$

$$= \int \frac{x+1}{x+1} dx - \int \frac{1}{x+1} dx + \int \frac{2(x+1)}{(x+1)^2} dx - 3\int \frac{1}{(x+1)^2} dx$$

$$= \int dx - \int \frac{1}{x+1} dx + 2\int \frac{1}{x+1} dx - 3\int (x+1)^{-2} dx$$

$$= x - \log|x+1| + 2\log|x+1| + \frac{3}{x+1} + c$$

$$= x + \log|x+1| + \frac{3}{x+1} + c$$

$$\therefore \quad I = x + \log|x+1| + \frac{3}{x+1} + c$$

Indefinite Integrals Ex 19.4 Q6

Let $I = \int \frac{2x - 1}{(x-1)^2} dx$. Then,

$$I = \int \frac{2x - 1 + 2 - 2}{(x-1)^2} dx$$

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

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

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

$$= 2\log|x-1| - (x-1)^{-1} + c$$

$$= 2\log|x-1| - \frac{1}{x-1} + c$$

$$\therefore \quad I = \frac{-1}{x-1} + 2\log|x-1| + c.$$

********** END **********