Indefinite Integrals Ex 19.4 Q1

$$\text{Let } I = \int \frac{x^2 + 5x + 2}{x + 2} dx$$

Using long division method, we have

$$\frac{x^2 + 5x + 2}{x + 2} = x + 3 - \frac{4}{x + 2}$$

$$\therefore \quad I = \int \frac{x^2 + 5x + 2}{x + 2} = \int \left(x + 3 - \frac{4}{x + 2} \right) dx$$

$$\Rightarrow \quad I = \int x dx + 3\int dx - 4\int \frac{1}{x + 2} dx$$

$$= \frac{x^2}{2} + 3x - 4\log|x + 2| + c$$

$$\therefore \quad I = \frac{x^2}{2} + 3x - 4\log|x + 2| + c$$

Indefinite Integrals Ex 19.4 Q2

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

Using long division method, we have

$$\frac{x^3}{x - 2} = x^2 + 2x + 4 + \frac{8}{x - 2}$$

$$\therefore \quad I = \int \left(x^2 + 2x + 4 + \frac{8}{x - 2} \right) dx$$

$$= \int x^2 dx + 2\int x dx + 4\int dx + 8\int \frac{1}{x - 2} dx$$

$$= \frac{x^3}{3} + \frac{2x^2}{2} + 4x + 8\log|x - 2| + c$$

$$= \frac{x^3}{3} + x^2 + 4x + 8\log|x - 2| + c$$

$$\therefore \quad I = \frac{x^3}{3} + x^2 + 4x + 8\log|x - 2| + c$$

Indefinite Integrals Ex 19.4 Q3

Let $I = \int \frac{x^2 + x + 5}{3x + 2} dx$

Using long division method, we have

$$\frac{x^2 + x + 5}{3x + 2} = \frac{x}{3} + \frac{1}{9} + \frac{43}{9} \times \frac{1}{3x + 2}$$

$$\therefore \quad I = \int \left(\frac{x}{3} + \frac{1}{9} + \frac{43}{9} \times \frac{1}{3x + 2} \right) dx$$

$$= \frac{x^2}{6} + \frac{1}{9} \times x + \frac{43}{9 \times 3} |3x + 2| + c$$

$$= \frac{x^2}{6} + \frac{1}{9} \times x + \frac{43}{27} \times \log |3x + 2| + c$$

$$\therefore \quad I = \frac{x^2}{6} + \frac{1}{9} \times x + \frac{43}{27} \times \log |3x + 2| + c$$

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