

1. Evaluate the following indefinite integrals using partial fractions:

(a)  $\int \frac{x}{x^2 - 9} dx$

(c)  $\int \frac{2x + 1}{x^3 - 4x^2 + 4x} dx$

(b)  $\int \frac{x + 2}{x^2 - 4x + 3} dx$

(d)  $\int \frac{3x - 7}{x(x^2 + 4x + 7)} dx$

2. Evaluate the following indefinite integrals by integration by parts:

(a)  $\int x^2 e^x dx$

(d)  $\int x \sin x dx$

(b)  $\int x \ln x dx$

(e)  $\int e^x \sin x dx$

(c)  $\int x^2 \cos x dx$

(f)  $\int \ln x dx$

3. Evaluate the following definite integrals:

(a)  $\int_{-2}^2 \frac{1}{x + 3} dx$

(e)  $\int_0^{\sqrt{\pi}} x \cos \left( x^2 - \frac{\pi}{2} \right) dx$

(b)  $\int_0^2 (x^4 + 3x^2 + 2) dx$

(f)  $\int_0^{\pi} x \sin x dx$

(c)  $\int_{-\pi}^{\pi} (5 \sin x - 7 \cos x) dx$

(g)  $\int_0^1 \frac{1}{x^2 - 4} dx$

(d)  $\int_{-3}^2 2x e^{(x^2+1)} dx$

(h)  $\int_0^2 \frac{1}{x^2 + 4} dx$

4. Find the following areas:

(a) Find the area of the region bounded by the curve  $y = \sin x$  and the  $x$ -axis between  $x = -\pi$  and  $x = \pi$ .

(b) Find the area of the region bounded by the curve  $y = \cos x$  and the  $x$ -axis between  $x = -\frac{\pi}{2}$  and  $x = \frac{3\pi}{2}$ .

(c) Find the area of the region bounded by the curve  $y = x^3$ , the straight line  $y = 8$  and the  $y$ -axis.