

9. Indefinite integral

Problem 1: EMEA 295, cv. 1 / b, c

Find the following integrals by using $\int x^n dx = \frac{1}{n+1} x^{n+1}$ where $n \neq -1$:

(a) $\int x\sqrt{x} dx$; (b) $\int \frac{1}{\sqrt{x}} dx$

Problem 2: EMEA 295, cv. 3 *

In the manufacture of a product, the marginal cost of producing x units is $C'(x)$ and fixed costs are $C(0)$. Find the total cost function $C(x)$ when:

(a) $C'(x) = 3x + 4, C(0) = 40$; (b) $C'(x) = ax + b, C(0) = C_0$

Problem 3: EMEA 296, cv. 4

Find the following integrals:

(a) $\int (t^3 + 2t - 3) dt$; (b) $\int (x - 1)^2 dx$; (c) $\int (x - 1)(x + 2) dx$;
(d) $\int (x + 2)^3 dx$; (e) $\int (e^{3x} - e^{2x} + e^x) dx$; (f) $\int \frac{x^3 - 3x + 4}{x} dx$;

Problem 4: EMEA 316, cv. 1

Use integration by parts to evaluate the following:

(a) $\int xe^{-x} dx$; (b) $\int 3xe^{4x} dx$; (c) $\int (1 + x^2)e^{-x} dx$; (d) $\int x \ln x dx$

Problem 5: EMEA 318, cv. 1

Find the following integrals by means of an appropriate substitution:

(a) $\int (x^2 + 1)^8 2x dx$; (b) $\int (x + 2)^{10} dx$; (c) $\int \frac{2x-1}{x^2-x+8} dx$

Problem 6: EMEA 318, cv. 2

Find the following integrals:

(a) $\int x(2x^2 + 3)^5 dx$; (b) $\int x^2 e^{x^3+2} dx$; (c) $\int \frac{\ln(x+2)}{2x+4} dx$;
(d) $\int x\sqrt{1+x} dx$; (e) $\int \frac{x^3}{(1+x^2)^3} dx$; (f) $\int x^5 \sqrt{4-x^3} dx$;