

Integration by substitution

1. Evaluate:

(a) $\int e^{ax} 2^x dx$	(b) $\int (2^x + 3^x)^2 dx$	(c) $\int \frac{dx}{x \ln x \ln(\ln x)}$	(d) $\int \frac{dx}{e^x + e^{-x}}$
(e) $\int \frac{e^x dx}{ae^x + b}$	(f) $\int \frac{e^x dx}{\sqrt{e^x + 1}}$	(g) $\int \frac{e^{\sqrt{x}} - 3}{\sqrt{x}} dx$	(h) $\int \frac{\ln 2x}{x} dx$
(i) $\int e^{\sin x} \cos x dx$	(j) $\int e^x (1 - e^x)^n dx$	(k) $\int \frac{dx}{x(1 + \ln x)^2}$	(l) $\int_0^{\sqrt{\ln 2}} x^3 e^{-x^2} dx$
(m) $\int_0^{1/2} x \ln \frac{1+x}{1-x} dx$	(n) $\int \frac{2^x 3^x}{9^x - 4^x} dx$	(o) $\int \sec 3x \tan 3x dx$	(p) $\int \sec^2(3x + 7) dx$
(q) $\int \frac{\cos x}{\sin^2 x} dx$	(r) $\int \cos^2 3x \sin 2x dx$	(s) $\int \tan \frac{x}{2} dx$	(t) $\int \frac{\cos x dx}{1 + 2 \sin x}$
(u) $\int x \sin(x^2) dx$	(v) $\int \tan^2 x \sec^2 x dx$	(w) $\int (\cos x + 2 \sin x)^2 dx$	(x) $\int x \csc^2 x^2 dx$
(y) $\int (\tan x + \cot x)^2 dx$	(z) $\int \frac{\cos x dx}{\sqrt{a + b \sin x}}$		

2. Evaluate:

(a) $\int \frac{\sin \sqrt{x}}{\sqrt{x}} dx$	(b) $\int \sin x \sin 3x dx$	(c) $\int \sin 2x \cos x dx$
(d) $\int \tan \sqrt{1+x^2} \frac{xdx}{\sqrt{1+x^2}}$	(e) $\int \frac{dx}{A^2 \sin^2 x + B^2 \cos^2 x}$	(f) $\int \frac{dx}{\sin x \cos x}$
(g) $\int \frac{dx}{\sin^2 \left(x + \frac{\pi}{4} \right)}$	(h) $\int \frac{\sin x \cos x}{1 + \sin^4 x} dx$	(i) $\int \frac{\sin x + \cos x}{\sqrt[3]{\sin x - \cos x}} dx$
(j) $\int \frac{x^2 - 1}{x^4 + 1} dx$	(k) $\int \sqrt{\frac{a+x}{a-x}} dx$	(l) $\int_{-\pi/4}^{\pi/4} \tan x dx$
(m) $\int_{-1/5}^{1/5} x \sqrt{2-5x} dx$		

3. Evaluate $\int \frac{x^3 dx}{\sqrt{x^2 - a^2}}$ by substituting $t = \sqrt{x^2 - a^2}$.

4. Evaluate:

(a) $\int \frac{dx}{(x+1)(x+2)(x+3)}$	(b) $\int \frac{dx}{x^3 + 1}$	(c) $\int \frac{dx}{x^2 - 3x + 2}$	(d) $\int \frac{xdx}{(x^2 - b^2)^2}$
(e) $\int \frac{dx}{(x^2 - 3)(x + 4)}$	(f) $\int \frac{x^2 dx}{(1-x)^{100}}$	(g) $\int \frac{dx}{\sqrt{x+1} + \sqrt{x-1}}$	(h) $\int \cos mx \cos nx dx$
(i) $\int \frac{\cos^4 x}{\sin^3 x} dx$	(j) $\int \frac{dx}{\sin^3 x \cos^5 x}$	(k) $\int \frac{dx}{\sin x \cos^4 x}$	(l) $\int \sin 5x \cos x dx$
(m) $\int (18x - 4) \sqrt{ax + bx} dx$	(n) $\int (18x - 6) \sqrt{-9x^2 + 6x} dx$	(o) $\int \frac{\sqrt{x+1} - \sqrt{x-1}}{\sqrt{x+1} + \sqrt{x-1}} dx$	
(p) $\int \sin x \sin \frac{x}{2} \sin \frac{x}{3} dx$	(q) $\int \frac{dx}{\sin(x+a) \sin(x+b)}$	(r) $\int \tan x \tan(x+a) dx$	