

Antiderivative techniques

[1] Use substitution as needed to find each antiderivative.

[a] $\int x\sqrt{6x^2-4} dx$	[b] $\int \frac{x}{x^2+1} dx$	[c] $\int \frac{x}{(x^2+1)^2} dx$	[d] $\int \frac{1}{x^2+1} dx$
[e] $\int \frac{x^2}{x^2+1} dx$	[f] $\int e^{3x+4} dx$	[g] $\int x \cdot e^{x^2} dx$	[h] $\int \frac{\sin x}{\cos x} dx$
[i] $\int \frac{\cos x}{\sin x} dx$	[j] $\int \frac{\sec x(\sec x + \tan x)}{\sec x + \tan x} dx$	[k] $\int \frac{\tan \frac{1}{x}}{x^2} dx$	[l] $\int x^2(1-x^3)^4 dx$
[m] $\int \sin x \cdot e^{\cos x} dx$	[n] $\int x^2 \cos(x^3+1) dx$	[o] $\int \frac{\sec(\ln x) \cdot \tan(\ln x)}{x} dx$	[p] $\int \frac{\sec(\sqrt{x})}{\sqrt{x}} dx$
[q] $\int x(x-3)^4 dx$	[r] $\int x^3\sqrt{x^2+1} dx$	[s] $\int \frac{e^x}{e^x+2} dx$	[t] $\int \frac{\sin x}{\cos x+2} dx$

[2] Evaluate each definite integral.

[a] $\int_0^1 \frac{x}{x^2+1} dx$	[b] $\int_0^{\sqrt{\pi}} x \sin x^2 dx$	[c] $\int_1^4 \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$	[d] $\int_0^4 x\sqrt{x^2+9} dx$
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[3] Use parts to find each antiderivative.

[a] $\int x \cdot \cos x dx$	[b] $\int x^2 \cdot \sin x dx$	[c] $\int x^3 \cdot e^x dx$	[d] $\int x^4 \cdot \ln x dx$
[e] $\int e^x \cdot \cos x dx$	[f] $\int e^{2x} \cdot \sin 3x dx$	[g] $\int \ln x dx$	[h] $\int \sin^{-1} x dx$
[i] $\int \tan^{-1} x dx$	[j] $\int x^4 \cdot \sin 2x dx$	[k] $\int x^4 \cdot \cos 3x dx$	[l] $\int (\ln x)^2 dx$
[m] $\int \sec^3 x dx$			

[4] Evaluate each definite integral.

[a] $\int_0^{\pi} x \sin x$	[b] $\int_0^1 x^2 \cdot e^x dx$	[c] $\int_1^e x \cdot \ln x dx$	[d] $\int_0^{\sqrt{3}} \tan^{-1} x dx$
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[5] Use partial fractions as needed to find each antiderivative.

[a] $\int \frac{1}{x^2-6x+8} dx$	[b] $\int \frac{x}{x^2-6x+8} dx$	[c] $\int \frac{x^2}{x^2-6x+8} dx$	[d] $\int \frac{x-3}{x^2-6x+8} dx$
[e] $\int \frac{1}{x^2-9} dx$	[f] $\int \frac{x}{x^2-9} dx$	[g] $\int \frac{2}{2x^2+3x-2} dx$	[h] $\int \frac{3x}{2x^2+3x-2} dx$
[i] $\int \frac{1}{x^3-4x} dx$	[j] $\int \frac{1}{x^3-x^2-6x} dx$	[k] $\int \frac{x}{6x^2+7x+2} dx$	[l] $\int \frac{1}{9x^2-4} dx$

[6] Find the antiderivative of these trig functions

[a] $\int \sin^2 x dx$	[b] $\int \cos^2 x dx$	[c] $\int \sec^2 x dx$	[d] $\int \csc^2 x dx$
[e] $\int \tan^2 x dx$	[f] $\int \cot^2 x dx$	[g] $\int \sec x \cdot \tan x dx$	[h] $\int \csc x \cdot \cot x dx$

