

Calculus 1 - Exercises 11

1. Find the indefinite integrals.

a) $\int (2x+3)^5 dx$	b) $\int \frac{1}{(2x+3)^5} dx$	c) $\int \frac{2}{9x+1} dx$
d) $\int \frac{2}{(9x+1)^2} dx$	e) $\int \frac{2}{9x^2+1} dx$	f) $\int \frac{2}{9x^2+3} dx$
g) $\int \frac{2x}{9x^2+3} dx$	h) $\int \sqrt{5x-8} dx$	i) $\int \sqrt[3]{1-2x} dx$
j) $\int e^{11x} + \cos(111x) dx$	k) $\int \frac{x^3}{x^4+5} dx$	l) $\int \operatorname{tg} x dx$
m) $\int \frac{e^{3x}}{e^{3x}+5} dx$	n) $\int \frac{1}{x \ln x} dx$	o) $\int \frac{1}{\sqrt{1-x^2} \cdot \arcsin x} dx$

2.* Find the indefinite integrals.

a) $\int \frac{1}{x^2+2x+3} dx$	b) $\int \frac{x+1}{x^2+2x+3} dx$	c) $\int \frac{x+5}{x^2+2x+3} dx$	d) $\int \frac{3x+5}{4x^2+2} dx$
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3. Find the indefinite integrals.

a) $\int x^2(x^3-2)^5 dx$	b) $\int x \cdot \sqrt[3]{x^2+1} dx$	c) $\int \frac{x}{\sqrt{x^2+1}} dx$
d) $\int \frac{x}{\sqrt{(x^2+1)^3}} dx$	e) $\int e^{9x}(e^{9x}+1)^9 dx$	f) $\int x e^{3x^2} dx$
g) $\int \frac{e^{\sqrt{t}}}{\sqrt{t}} dt$	h) $\int \sin^3 x \cos x dx$	i) $\int \frac{\ln x}{x} dx$
j) $\int \frac{\ln^3 x}{x} dx$	k) $\int \frac{1}{x \ln^3 x} dx$	l) $\int x \cos x dx$
m) $\int x e^{2x} dx$	n) $\int x^2 e^x dx$	o) $\int \ln x dx$
p) $\int \operatorname{arctg} 2x dx$	q) $\int e^x \sin x dx$	r) $\int \frac{\ln x}{\sqrt{x}} dx$

4.* Find the indefinite integrals.

a) $\int \sin^2 x dx$	b) $\int \sin^3 x dx$	c) $\int \sin^4 x dx$	d) $\int \sin^3 x \cos^2 x dx$
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Reminder

- $\int f(ax+b) dx = \frac{F(ax+b)}{a} + c$, where $F' = f$, $a \neq 0$
- $\int \frac{f'(x)}{f(x)} dx = \ln |f(x)| + c$
- $\int f'(x) f^\alpha(x) dx = \frac{f^{\alpha+1}(x)}{\alpha+1} + c$, if $\alpha \neq -1$
- $\int f'(x) e^{f(x)} dx = e^{f(x)} + c$
- $\int f(g(x)) g'(x) dx = F(g(x)) + c$, where $F' = f$
- Integration by parts: $\int f' g = f g - \int f g'$