

# Calculus II

## Summary of building block integrals

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# Building block integral summary

Type	a	b	Type a, lin. sub.	Type b, lin. sub
I	$\int \frac{1}{x} dx$	$\int \frac{1}{x^n} dx$	$\int \frac{A}{ax+b} dx$	$\int \frac{A}{(ax+b)^n} dx$
II	$\int \frac{x}{x^2+1} dx$	$\int \frac{x}{(x^2+1)^n} dx$	$\int \frac{A(x+\frac{b}{2a})}{ax^2+bx+c} dx$	$\int \frac{A(x+\frac{b}{2a})}{(ax^2+bx+c)^n} dx$
III	$\int \frac{1}{x^2+1} dx$	$\int \frac{1}{(x^2+1)^n} dx$	$\int \frac{B}{ax^2+bx+c} dx$	$\int \frac{B}{(ax^2+bx+c)^n} dx$

where  $A, B$  are arbitrary constants and  $a, b, c$  are constants with  $b^2 - 4ac < 0$ . The quadratics in the denominators have no real roots.

- We solved building blocks I, II and III in almost complete detail.
- The types in the remaining columns can be transformed to building block ones:
  - Block I, linear substitutions: done in full detail.
  - Block IIa, IIIa, linear substitutions: done in full detail, by means of completing the square.
  - Block IIb, IIIb, linear substitutions: done by means of completing the square; computations are analogous and we leave them for exercise.