1. Pochodne

$$\sqrt{x} \to \frac{1}{2\sqrt{x}}$$
$$\sin x \to \cos x$$
$$\cos x \to -\sin x$$
$$\operatorname{tg} x \to \frac{1}{\cos^2 x}$$
$$ctg\, x \to \frac{-1}{\sin^2 x}$$
$$\ln x \to \frac{1}{x}$$
$$\frac{1}{x} \to \frac{-1}{x^2}$$
$$f(g(x)) \to f'(g(x)) \cdot g'(x)$$

2. Całki

$$\int x^a \, dx = \frac{x^{a+1}}{a+1} + c$$
$$\int \frac{dx}{x} = \ln|x| + c$$
$$\int \frac{dx}{x^2 + a_2} = \frac{1}{a} \arctan \frac{x}{a} + c$$
$$\int \frac{dx}{\sqrt{a^2 - x^2}} = \arcsin \frac{x}{a} + c$$
$$\int e^x \, dx = e^x + c$$
$$\int a^x \, dx = \frac{a^x}{\ln a} + c$$
$$\int \cos x \, dx = \sin x + c$$
$$\int \sin x \, dx = -\cos x + c$$
$$\int \frac{dx}{\cos^2 x} = \operatorname{tg} x + c$$
$$\int \frac{dx}{\sin^2 x} = -ctg\, x + c$$
$$\int \frac{dx}{ax + b} = \frac{1}{x} \ln|ax + b| + c$$
$$\int \operatorname{tg} x \, dx = -\ln|\cos x| + c$$
$$\int ctg\, x \, dx = \ln|\sin x| + c$$
$$\int (ax+b)^n \, dx = \frac{(ax+b)^{n+1}}{a(n+1)} + c$$
$$\int \frac{dx}{a^2 - x^2} = \frac{1}{2a} \ln\left|\frac{a+x}{a-x}\right| + c$$
$$\int \sqrt{a^2 - x^2} \, dx = \frac{a^2}{2} \arcsin \frac{x}{a} + \frac{x}{2}\sqrt{a^2 - x^2} + c$$

Całkowanie przez części

$$\int f(x) \cdot g'(x) \, dx = f(x) \cdot g(x) - \int f'(x) \cdot g(x) \, dx$$

Całkowanie przez podstawianie

$$\int_a^b f(g(x)) \cdot g'(x) \, dx = \int_{g(a)}^{g(b)} f(t) \, dt, \quad t = g(x)$$

3. Fourier

$$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} \left(a_n \cos \frac{2\pi n x}{T} + b_n \sin \frac{2\pi n x}{T} \right)$$

Gdzie:

$$a_0 = \frac{1}{T} \int_T^T f(x)\ dx$$

$$a_n = \frac{1}{T} \int_T^T f(x) \cos \frac{\pi n x}{T}\ dx$$

$$b_n = \frac{1}{T} \int_T^T f(x) \sin \frac{\pi n x}{T}\ dx$$

Tożsamość Parsevala

$$\frac{1}{\pi} \int_{-\pi}^{\pi} f^2(x)\ dx = \frac{a_0^2}{2} + \sum_{n=1}^{\infty} \left(a_n^2 + b_n^2 \right)$$

4. funkcja dwóch zmiennych

Jeśli $f_{xy}^{"} \neq f_{yx}^{"}$ to zjebałeś.

$$W(P) = \begin{vmatrix} f_{xx}^{"}(P) & f_{xy}^{"}(P) \\ f_{xy}^{"}(P) & f_{yy}^{"}(P) \end{vmatrix}$$

Jeśli $W(P) > 0$ to ekstremum.

Jeśli $W(P) < 0$ to nie ekstremum, w innym przypadku chuj wie.

Jeżeli $f_{xx}^{"}(P) > 0$ to maksimum.

Jeżeli $f_{xx}^{"}(P) < 0$ to minimum.