$$\boxed{\Gamma(p) := \int_0^\infty t^{p-1} e^{-t}\, dt \,, \quad p>0}$$

$$\boxed{N(m, \sigma^2) \to f(x) = \frac{1}{\sigma\sqrt{2\pi}}\, e^{-\frac{(x-m)^2}{2\sigma^2}}}$$

$$\Gamma\left(\tfrac{1}{2}\right) = \int_0^\infty t^{1/2-1} e^{-t}\, dt = \int_0^\infty \frac{e^{-t}}{\sqrt{t}}\, dt = \begin{bmatrix} t = \frac{x^2}{2} \\ dt = x\, dx \end{bmatrix} = \int_0^\infty \frac{e^{-\frac{x^2}{2}}}{\frac{x}{\sqrt{2}}}\, x\, dx$$

$$= \sqrt{2}\int_0^\infty e^{-\frac{x^2}{2}}\, dx = 2\sqrt{\pi}\underbrace{\int_0^\infty \frac{e^{-\frac{x^2}{2}}}{\sqrt{2\pi}}\, dx}_{\text{gęstość } N(0,1) \text{ na } [0,\infty)} = 2\sqrt{\pi}\cdot\frac{1}{2} = \sqrt{\pi}$$

mnożenie przez 1