

The following identity may be regarded as a formulation of the Weierstrass product for the Gamma function.

$$\int_0^{\infty} t^x e^{-t} \frac{dt}{t} = \frac{1}{x} \prod_{k=1}^{\infty} \frac{(1 + \frac{1}{k})^x}{(1 + \frac{x}{k})}$$

Understanding the derivation of this identity is reasonable for a bright student of first year undergraduate calculus in the United States.