Gammafunktionen $\Gamma(\alpha)$

Definition: $\Gamma(\alpha) = \int_0^\infty y^{\alpha-1} e^{-y} dy$

$\alpha = 1$: $\Gamma(\alpha) = \int_0^\infty e^{-y} dy = \left[-e^{-y}\right]_0^\infty = -0 - (-1) = 1$

Notera att $\int_0^\infty e^{-y} dy = 1$

$\alpha = 2$: $\Gamma(\alpha) = \int_0^\infty y e^{-y} dy = \left[y \cdot (-e^{-y})\right]_0^\infty - \int_0^\infty 1 \cdot (-e^{-y}) dy = \left[-\frac{y}{e^y}\right]_0^\infty + \int_0^\infty e^{-y} dy = 0 - 0 + 1$

g·f = g · F - g' · F

Notera att $\int_0^\infty y e^{-y} dy = 1$

$\alpha = 3$: $\Gamma(\alpha) = \int_0^\infty y^2 e^{-y} dy = \left[y^2 \cdot (-e^{-y})\right]_0^\infty - \int_0^\infty 2y \cdot (-e^{-y}) dy = \left[-\frac{y^2}{e^y}\right]_0^\infty + \int_0^\infty 2y e^{-y} dy = 0 - 0 + 2$

g·f = g · F - g' · F

Notera att $\int_0^\infty y^2 e^{-y} dy = 2$

$\alpha = 4$: $\Gamma(\alpha) = \int_0^\infty y^3 e^{-y} dy = \left[y^3 \cdot (-e^{-y})\right]_0^\infty - \int_0^\infty 3y^2 \cdot (-e^{-y}) dy = \left[-\frac{y^3}{e^y}\right]_0^\infty + \int_0^\infty 3y^2 e^{-y} dy = 0 - 0 + 6$

g·f = g · F - g' · F

Notera att $\int_0^\infty y^3 e^{-y} dy = 6$