PROOF OF FORMULA 3.371

$$\int_0^\infty x^{n-1/2} e^{-\mu x}\, dx = \frac{\sqrt{\pi}\,(2n-1)!!}{2^n \mu^{n+1/2}}$$

The change of variables $t = \mu x$ gives

$$\int_0^\infty x^{n-1/2} e^{-\mu x}\, dx = \mu^{-n-1/2} \int_0^\infty t^{n-1/2} e^{-t}\, dt = \mu^{-n-1/2} \Gamma(n + \tfrac{1}{2}).$$

The result now follows from

$$\Gamma(n + \tfrac{1}{2}) = \frac{\sqrt{\pi}}{2^n}(2n-1)!!$$

that appears as entry **8.339.2**.