

**PROOF OF FORMULA 3.562.6**

$$\int_0^{\infty} x^2 e^{-\beta x^2} \cosh \gamma x \, dx = \frac{\sqrt{\pi} (2\beta + \gamma^2)}{8\beta^2 \sqrt{\beta}} e^{\gamma^2/4\beta}$$

Entry 3.562.3 states that

$$\int_0^{\infty} x e^{-\beta x^2} \sinh(\gamma x) \, dx = \frac{\gamma}{4\beta} \sqrt{\frac{\pi}{\beta}} e^{\gamma^2/4\beta}.$$

The result follows by differentiating with respect to the parameter  $\gamma$ .