

**PROOF OF FORMULA 4.267.18**

$$\int_0^\infty \frac{x^{p-1} - x^{q-1}}{(1+x^r) \ln x} dx = \ln \left( \tan \frac{\pi p}{2r} \cot \frac{\pi q}{2r} \right)$$

The change of variables  $x = e^t$  gives

$$\int_0^\infty \frac{x^{p-1} - x^{q-1}}{(1+x^r) \ln x} dx = \int_{-\infty}^\infty \frac{e^{pt} - e^{qt}}{1+e^{rt}} \frac{dt}{t}.$$

Entry 3.411.29 now gives the result.