

PROOF OF FORMULA 4.267.13

$$\int_0^1 \frac{(x^p - 1)(x^q - 1)}{\ln x} dx = \ln \left[\frac{p + q + 1}{(p + 1)(q + 1)} \right]$$

Entry 4.267.8 states that

$$\int_0^1 \frac{x^{p-1} - x^{q-1}}{\ln x} dx = \ln \frac{p}{q}.$$

This is used to produce the result from

$$\int_0^1 \frac{(x^p - 1)(x^q - 1)}{\ln x} dx = \int_0^1 \frac{x^{p+q} - x^q}{\ln x} dx - \int_0^1 \frac{x^p - 1}{\ln x} dx.$$