

PROOF OF FORMULA 4.272.18

$$\int_0^1 (\ln 1/x)^{2-1/n} (x^{p-1} - x^{q-1}) dx = \Gamma(3 - 1/n) (p^{1/n-3} - q^{1/n-3})$$

The change of variables $t = \ln 1/x$ gives

$$\int_0^1 (\ln 1/x)^{2-1/n} (x^{p-1} - x^{q-1}) dx = \int_0^\infty t^{2-1/n} e^{-pt} dt - \int_0^\infty t^{2-1/n} e^{-qt} dt.$$

The result now follows from the change of variables $w = pt$ and $w = qt$, respectively.