

PROOF OF FORMULA 4.227.17

$$\int_0^{\pi/2} \ln(a^2 + b^2 \tan^2 x) dx = \frac{1}{2} \int_0^{\pi} \ln(a^2 + b^2 \tan^2 x) dx = \pi \ln(a + b)$$

Write the integral as

$$\int_0^{\pi/2} \ln(a^2 + b^2 \tan^2 x) dx = \int_0^{\pi/2} \ln(a^2 \cos^2 x + b^2 \sin^2 x) dx - 2 \int_0^{\pi/2} \ln \cos x dx.$$

The result now follows from entry **4.226.6**

$$\int_0^{\pi/2} \ln(a^2 \cos^2 x + b^2 \sin^2 x) dx = \pi \ln\left(\frac{a + b}{2}\right)$$

and **4.224.6**

$$\int_0^{\pi/2} \ln \cos x dx = -\frac{\pi}{2} \ln 2.$$