

Exercise 6

Show that

$$\int_0^{\infty} \frac{dx}{\sqrt{x}(x^2+1)} = \frac{\pi}{\sqrt{2}}$$

by integrating an appropriate branch of the multiple-valued function

$$f(z) = \frac{z^{-1/2}}{z^2+1} = \frac{e^{(-1/2)\log z}}{z^2+1}$$

over (a) the indented path in Fig. 101, Sec. 82; (b) the closed contour in Fig. 103, Sec. 84.