

! For an efficient use of these tables, first read [HowTo.pdf](#).

T2.78B. Integrands involving trigonometric and inverse trigonometric functions on the interval $(0, \pi)$.

$$1. \int_0^\pi \arctan\left(\frac{p \sin x}{1 - p \cos x}\right) \sin(nx) dx = \frac{\pi}{2n} p^n, \quad p^2 < 1.$$

$$2. \int_0^\pi \arctan\left(\frac{p \sin x}{1 - p \cos x}\right) \sin(nx) \cos x dx = \frac{\pi}{4} \left(\frac{p^{n+1}}{n+1} + \frac{p^{n-1}}{n-1} \right), \quad p^2 < 1.$$

$$3. \int_0^\pi \arctan\left(\frac{p \sin x}{1 - p \cos x}\right) \cos(nx) \sin x dx = \frac{\pi}{4} \left(\frac{p^{n+1}}{n+1} - \frac{p^{n-1}}{n-1} \right), \quad p^2 < 1.$$

$$4. \int_0^\pi \arctan\left(\frac{p \sin x}{1 - p \cos x}\right) \frac{dx}{\sin x} = \frac{\pi}{2} \ln \frac{1+p}{1-p}, \quad p^2 < 1.$$

$$5. \int_0^\pi \arctan\left(\frac{p \sin x}{1 - p \cos x}\right) \frac{dx}{\tan x} = -\frac{\pi}{2} \ln(1-p^2), \quad p^2 < 1.$$