! For an efficient use of these tables, first read `HowTo.pdf`.

T2.73B. Integrands involving logarithms, trigonometric functions and rational functions on the interval $(0, \pi/2)$.

1. $$\int_0^{\pi/2} \ln\left(1-k^2\sin^2 x\right)\frac{\sin x\cos x}{\sqrt{1-k^2\sin^2 x}}x\,dx$$
$$= \frac{1}{k^2}\big\{\pi k'(1-\ln k') + (2-k^2)\mathbf{K}(k) - (4-\ln k')\mathbf{E}(k)\big\}.$$

2. $$\int_0^{\pi/2} \ln\left(1-k^2\cos^2 x\right)\frac{\sin x\cos x}{\sqrt{1-k^2\cos^2 x}}x\,dx = \frac{1}{k^2}\big\{-\pi-(2-k^2)\mathbf{K}(k)+(4-\ln k')\mathbf{E}(k)\big\}.$$

3. $$\int_0^{\pi/2} \ln(1-k^2\sin^2 x)\frac{x\,\sin x\cos x}{\sqrt{(1-k^2\sin^2 x)^3}}\,dx = \frac{1}{k^2}\left\{(1+\ln k')\frac{\pi}{k'}-(2+\ln k')\mathbf{K}(k)\right\}.$$

4. $$\int_0^{\pi/2} \ln(1-k^2\cos^2 x)\frac{x\,\sin x\cos x}{\sqrt{(1-k^2\cos^2 x)^3}}\,dx = \frac{1}{k^2}\{-\pi+(2+\ln k')\mathbf{K}(k)\}.$$

5. $$\int_0^{\pi/2} \ln(1-k^2\sin^2 x)\sqrt{1-k^2\sin^2 x}\,\sin x\cos x\cdot x\,dx$$
$$= \frac{1}{27k^2}\{3\pi k'^3(1-3\ln k')+(22k'^2+6k^4-3k'^2\ln k')\mathbf{K}(k)-(2-k^2)(14-6\ln k')\mathbf{E}(k)\}.$$

6. $$\int_0^{\pi/2} \ln(1-k^2\cos^2 x)\sqrt{1-k^2\cos^2 x}\,\sin x\cos x\cdot x\,dx$$
$$= \frac{1}{27k^2}\{-3\pi-(22k'^2+6k^4-3k'^2\ln k')\mathbf{K}(k)+(2-k^2)(14-6\ln k')\mathbf{E}(k)\}..$$
