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

T2.50C. Integrands involving product and division of trigonometric functions by powers of $(a + b\,x)$ on the intervals $(0, \pi/2)$, $(0, \pi)$ and $(0, 2n\pi)$.

1. $$\int_0^{\pi/2} x^m \cos x\,dx = \sum_{k=0}^{\lfloor m/2 \rfloor} (-1)^k \frac{m!}{(m-2k)!} \left(\frac{\pi}{2}\right)^{m-2k} + (-1)^{[m/2]} (2[m/2] - m)\,m!.$$

2. $$\int_0^{\pi} x^m \sin(nx)\,dx = \frac{(-1)^{n+1}}{n^{m+1}} \sum_{k=0}^{[m/2]} (-1)^k \frac{m!}{(m-2k)!} (n\pi)^{m-2k} - (-1)^{[m/2]} \frac{m!\,[m - 2E[m/2] - 1]}{n^{m+1}}.$$

3. $$\int_0^{\pi} x^m \cos(nx)\,dx = \frac{(-1)^n}{n^{m+1}} \sum_{k=0}^{\lfloor (m-1)/2 \rfloor} (-1)^k \frac{m!}{(m-2k-1)!} (n\pi)^{m-2k-1}$$
$$+ (-1)^{[(m+1)/2]} \frac{2[(m+1)/2] - m}{n^{m+1}}\, m!.$$

4. $$\int_0^{2n\pi} x^m \cos kx\,dx = -\sum_{j=0}^{m-1} \frac{j!}{k^{j+1}} \binom{m}{j} (2n\pi)^{m-j} \cos \frac{j+1}{2}\pi.$$
