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

T2.12C. Integrands of the form $\dfrac{x^n}{\sqrt{(a-x)(b-x)(c-x)(d-x)}}$, $n = 0, 1$; and $\dfrac{1}{x\sqrt{(a-x)(b-x)(c-x)(d-x)}}$ and $\dfrac{1}{(p-x)\sqrt{(a-x)(b-x)(c-x)(d-x)}}$ on the intervals (y, c) and (c, y).

Notation used: $\gamma = \arcsin\sqrt{\dfrac{(b-d)(c-y)}{(c-d)(b-y)}}$, $\delta = \arcsin\sqrt{\dfrac{(b-d)(y-c)}{(b-c)(y-d)}}$,

$$q = \sqrt{\frac{(b-c)(a-d)}{(a-c)(b-d)}}, \quad r = \sqrt{\frac{(a-b)(c-d)}{(a-c)(b-d)}}.$$

1. $$\int_y^c \frac{dx}{\sqrt{(a-x)(b-x)(c-x)(x-d)}} = \frac{2}{\sqrt{(a-c)(b-d)}} F(\gamma,\, r), \quad a > b > c > y \geq d.$$

2. $$\int_c^y \frac{dx}{\sqrt{(a-x)(b-x)(x-c)(x-d)}} = \frac{2}{\sqrt{(a-c)(b-d)}} F(\delta,\, q), \quad a > b \geq y > c > d.$$

3. $$\int_y^c \frac{x\,dx}{\sqrt{(a-x)(b-x)(c-x)(x-d)}} = \frac{2}{\sqrt{(a-c)(b-d)}} \left\{ (c-b)\Pi\left(\gamma,\, \frac{c-d}{b-d},\, r\right) + bF(\gamma,\, r) \right\},$$
$$a > b > c > y \geq d.$$

4. $$\int_c^y \frac{x\,dx}{\sqrt{(a-x)(b-x)(x-c)(x-d)}} = \frac{2}{\sqrt{(a-c)(b-d)}} \left\{ (c-d)\Pi\left(\delta,\, \frac{b-c}{b-d},\, q\right) + dF(\delta,\, q) \right\},$$
$$a > b \geq y > c > d.$$

5. $$\int_y^c \frac{dx}{x\sqrt{(a-x)(b-x)(c-x)(x-d)}}$$
$$= \frac{2}{bc\sqrt{(a-c)(b-d)}} \left\{ (b-c)\Pi\left(\gamma,\, \frac{b(c-d)}{c(b-d)},\, r\right) + cF(\gamma,\, r) \right\}, \quad a > b > c > y \geq d.$$

6. $$\int_c^y \frac{dx}{x\sqrt{(a-x)(b-x)(x-c)(x-d)}}$$
$$= \frac{2}{cd\sqrt{(a-c)(b-d)}}\left\{(d-c)\Pi\left(\delta,\, \frac{d(b-c)}{c(b-d)},\, q\right) + cF\left(\delta,\, q\right)\right\}, \quad a > b \geq y > c > d.$$

7. $$\int_y^c \frac{dx}{(p-x)\sqrt{(a-x)(b-x)(c-x)(x-d)}} = \frac{2}{(p-b)(p-c)\sqrt{(a-c)(b-d)}}$$
$$\times\left[(c-b)\Pi\left(\gamma,\, \frac{(c-d)(p-b)}{(b-d)(p-c)},\, r\right) + (p-c)\, F\left(\gamma,\, r\right)\right], \quad a > b > c > y \geq d,\ p \neq c.$$

8. $$\int_c^y \frac{dx}{(p-x)\sqrt{(a-x)(b-x)(x-c)(x-d)}} = \frac{2}{(p-c)(p-d)\sqrt{(a-c)(b-d)}}$$
$$\times\left[(c-d)\Pi\left(\delta,\, \frac{(b-c)(p-d)}{(b-d)(p-c)},\, q\right) + (p-c)\, F\left(\delta,\, q\right)\right], \quad a > b \geq y > c > d,\ p \neq c.$$