

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

T2.04B. Integrands of the form $\frac{1}{\sqrt{(a-x)(b-x)(c-x)^n}}$, $\frac{1}{\sqrt{(a-x)(b-x)^n(c-x)}}$,
and $\frac{1}{\sqrt{(a-x)^n(b-x)(c-x)}}$ for $n = 0, 1, 3, 5$, on the intervals (y, b) and (b, y) .

Notation used: $\delta = \arcsin \sqrt{\frac{(a-c)(b-y)}{(b-c)(a-y)}}$, $\kappa = \arcsin \sqrt{\frac{(a-c)(y-b)}{(a-b)(y-c)}}$,

$$p = \sqrt{\frac{a-b}{a-c}}, \quad q = \sqrt{\frac{b-c}{a-c}}.$$

$$1. \int_b^y \frac{dx}{\sqrt{(x-b)(y-x)}} = \pi, \quad 0 \leq b < y \leq 1.$$

$$2. \int_y^b \frac{dx}{\sqrt{(b-x)(y-x)}} = i\pi, \quad 0 \leq y < b \leq 1.$$

$$3. \int_y^b \frac{dx}{\sqrt{(a-x)(b-x)(x-c)}} = \frac{2}{\sqrt{a-c}} F(\delta, q), \quad a > b > y \geq c.$$

$$4. \int_b^y \frac{dx}{\sqrt{(a-x)(x-b)(x-c)}} = \frac{2}{\sqrt{a-c}} F(\kappa, p), \quad a \geq y > b > c.$$

$$5. \int_y^b \frac{x dx}{\sqrt{(a-x)(b-x)(x-c)}} = \frac{2}{\sqrt{a-c}} [(b-a)\Pi(\delta, q^2, q) + aF(\delta, q)], \quad a > b > y \geq c.$$

$$6. \int_b^y \frac{x dx}{\sqrt{(a-x)(x-b)(x-c)}} = \frac{2}{\sqrt{a-c}} [(b-c)\Pi(\kappa, p^2, p) + cF(\kappa, p)], \quad a \geq y > b > c.$$

$$7. \int_y^b \frac{dx}{\sqrt{(a-x)^3(b-x)(x-c)}} = \frac{2}{(a-b)\sqrt{a-c}} E(\delta, q), \quad a > b > y \geq c.$$

$$8. \int_b^y \frac{dx}{\sqrt{(a-x)^3(x-b)(x-c)}} = \frac{2}{(a-b)\sqrt{a-c}} [F(\kappa, p) - E(\kappa, p)] + \frac{2}{a-b} \sqrt{\frac{y-b}{(a-y)(y-c)}},$$

$$a > y > b > c.$$

$$9. \int_y^b \frac{dx}{\sqrt{(a-x)(b-x)(x-c)^3}} = \frac{2}{(b-c)\sqrt{a-c}} [F(\delta, q) - E(\delta, q)] + \frac{2}{b-c} \sqrt{\frac{b-y}{(a-y)(y-c)}},$$

$$a > b > y > c.$$

$$10. \int_b^y \frac{dx}{\sqrt{(a-x)(x-b)(x-c)^3}} = \frac{2}{(b-c)\sqrt{a-c}} E(\kappa, p), \quad a \geq y > b > c.$$

$$11. \int_y^b \frac{dx}{\sqrt{(a-x)^5(b-x)(x-c)}} = \frac{2}{3(a-b)^2\sqrt{(a-c)^3}} [2(2a-b-c)E(\delta, q) - (a-b)F(\delta, q)]$$

$$- \frac{2}{3(a-b)(a-c)} \sqrt{\frac{(b-y)(y-c)}{(a-y)^3}}, \quad a > b > y \geq c.$$

$$12. \int_b^y \frac{dx}{\sqrt{(a-x)^5(x-b)(x-c)}} = \frac{2}{3(a-b)^2\sqrt{(a-c)^3}} [(3a-b-2c)F(\kappa, p) - 2(2a-b-c)E(\kappa, p)]$$

$$+ \frac{2[4a^2 - 2ab - 3ac + bc - y(3a-b-2c)]}{3(a-b)^2(a-c)} \sqrt{\frac{y-b}{(a-y)^3(y-c)}}, \quad a > y > b > c.$$

$$13. \int_y^b \frac{dx}{\sqrt{(a-x)(b-x)(x-c)^5}} = \frac{2}{3(b-c)^2\sqrt{(a-c)^3}} [2(a+b-2c)F(\delta, q) - (b-c)E(\delta, q)]$$

$$+ \frac{2[ab - 3ac - 2bc + 4c^2 + y(2a+b-3c)]}{3(b-c)^2(a-c)} \sqrt{\frac{b-y}{(a-y)(y-c)^3}}, \quad a > b > y > c.$$

$$14. \int_b^y \frac{dx}{\sqrt{(a-x)(x-b)(x-c)^5}} = \frac{2}{3(b-c)^2\sqrt{(a-c)^3}} [2(a+b-2c)E(\kappa, p) - (b-c)F(\kappa, p)]$$

$$+ \frac{2}{3(a-c)(b-c)} \sqrt{\frac{(a-y)(y-b)}{(y-c)^3}}, \quad a \geq y > b > c.$$

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