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

T2.26B. Integrands of the form $\frac{1}{x^2}\sqrt{\frac{a^2 \pm x^2}{b^2 \pm x^2}}$ on the intervals (y, b) and (b, y).

Notation used: $\delta = \arccos\frac{y}{b}, \quad \varepsilon = \arccos\frac{b}{y},$

$$\zeta = \arcsin\frac{a}{b}\sqrt{\frac{b^2-y^2}{a^2-y^2}}, \quad \kappa = \arcsin\frac{a}{y}\sqrt{\frac{y^2-b^2}{a^2-b^2}},$$

$$q = \frac{\sqrt{a^2-b^2}}{a}, \quad r = \frac{b}{\sqrt{a^2+b^2}}, \quad s = \frac{a}{\sqrt{a^2+b^2}}, \quad t = \frac{b}{a}.$$

1. $\displaystyle\int_b^y \frac{dx}{x^2}\sqrt{\frac{a^2+x^2}{x^2-b^2}} = \frac{\sqrt{a^2+b^2}}{b^2}E(\varepsilon,\, s), \quad y > b > 0.$

2. $\displaystyle\int_y^b \frac{dx}{x^2}\sqrt{\frac{a^2-x^2}{b^2-x^2}} = \frac{a^2-b^2}{ab^2}F(\zeta,\, t) - \frac{a}{b^2}E(\zeta,\, t) + \frac{a^2}{b^2 y}\sqrt{\frac{b^2-y^2}{a^2-y^2}}, \quad a > b > y > 0.$

3. $\displaystyle\int_b^y \frac{dx}{x^2}\sqrt{\frac{a^2-x^2}{x^2-b^2}} = \frac{a}{b^2}E(\kappa,\, q) - \frac{1}{a}F(\kappa,\, q), \quad a \ge y > b > 0.$

4. $\displaystyle\int_y^b \frac{dx}{x^2}\sqrt{\frac{b^2-x^2}{a^2+x^2}} = \frac{\sqrt{(b^2-y^2)(a^2+y^2)}}{a^2 y} - \frac{\sqrt{a^2+b^2}}{a^2}E(\delta,\, r), \quad b > y > 0.$

5. $\displaystyle\int_b^y \frac{dx}{x^2}\sqrt{\frac{x^2-b^2}{a^2+x^2}} = \frac{\sqrt{a^2+b^2}}{a^2}\left\{F(\varepsilon,\, s) - E(\varepsilon,\, s)\right\}, \quad a > b > 0.$

6. $\displaystyle\int_y^b \frac{dx}{x^2}\sqrt{\frac{a^2+x^2}{b^2-x^2}} = \frac{\sqrt{a^2+b^2}}{b^2}\left\{F(\delta,\, r) - E(\delta,\, r)\right\} + \frac{\sqrt{(b^2-y^2)(a^2+y^2)}}{b^2 y}, \quad b > y > 0.$

7. $\displaystyle\int_y^b \frac{dx}{x^2}\sqrt{\frac{b^2-x^2}{a^2-x^2}} = \frac{1}{y}\sqrt{\frac{b^2-y^2}{a^2-y^2}} - \frac{1}{a}E(\zeta,\, t), \quad a > b > y > 0.$

8. $\displaystyle\int_b^y \frac{dx}{x^2}\sqrt{\frac{x^2-b^2}{a^2-x^2}} = \frac{1}{a}\left\{F(\kappa,\, q) - E(\kappa,\, q)\right\}, \quad a \geq y > b > 0.$