C4282

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

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

Notation used: $\lambda = \arcsin\sqrt{\dfrac{a^2-y^2}{a^2-b^2}}$, $\mu = \arcsin\sqrt{\dfrac{y^2-a^2}{y^2-b^2}}$,

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

1. $$\int_y^a \frac{dx}{x^2}\sqrt{\frac{a^2-x^2}{x^2-b^2}} = \frac{a}{b^2}E(\lambda,\, q) - \frac{1}{a}f(\lambda,\, q) - \frac{\sqrt{(a^2-y^2)(y^2-b^2)}}{b^2 y}, \quad a > y \geq b > 0.$$

2. $$\int_a^y \frac{dx}{x^2}\sqrt{\frac{x^2-a^2}{x^2-b^2}} = \frac{a}{b^2}E(\mu,\, t) - \frac{a^2-b^2}{ab^2}F(\mu,\, t) - \frac{1}{y}\sqrt{\frac{y^2-a^2}{y^2-b^2}}, \quad y > a > b > 0.$$

3. $$\int_y^a \frac{dx}{x^2}\sqrt{\frac{x^2-b^2}{a^2-x^2}} = \frac{1}{a}\left\{F(\lambda,\, q) - E(\lambda,\, q)\right\} + \frac{\sqrt{(a^2-y^2)(y^2-b^2)}}{a^2 y}, \quad a > y \geq b > 0.$$

4. $$\int_a^y \frac{dx}{x^2}\sqrt{\frac{x^2-b^2}{x^2-a^2}} = \frac{1}{a}E(\mu,\, t) - \frac{1}{y}\sqrt{\frac{y^2-a^2}{y^2-b^2}}, \quad y > a > b > 0.$$