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

T3.19A. Integrands of the form $\sqrt{\dfrac{x^2 \pm b^2}{(a^2 \pm x^2)^n}}$ for $n = 1, 3$ on the intervals (y, ∞).

Notation used: $\beta = \arctan \dfrac{\alpha}{y}, \quad \xi = \arcsin \sqrt{\dfrac{a^2+b^2}{a^2+y^2}}, \quad \nu = \arcsin \dfrac{a}{y},$

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

1. $\displaystyle\int_y^\infty \sqrt{\frac{x^2+b^2}{(x^2+a^2)^3}}\,dx = \frac{1}{a}E(\beta,\, q), \quad a > b,\ y \ge 0.$

2. $\displaystyle\int_y^\infty \sqrt{\frac{x^2+a^2}{(x^2+b^2)^3}}\,dx = \frac{a}{b^2}E(\beta,\, q) - \frac{a^2-b^2}{b^2}\frac{y}{\sqrt{(a^2+y^2)(b^2+y^2)}}, \quad a > b,\ y \ge 0.$

3. $\displaystyle\int_y^\infty \sqrt{\frac{x^2-b^2}{(a^2+x^2)^3}}\,dx = \frac{\sqrt{a^2+b^2}}{a^2}E(\xi,\, s) - \frac{b^2}{a^2\sqrt{a^2+b^2}}F(\xi,\, s), \quad y \ge b > 0.$

4. $\displaystyle\int_y^\infty \sqrt{\frac{x^2+a^2}{(x^2-b^2)^3}}\,dx = \frac{1}{\sqrt{a^2+b^2}}F(\xi,\, s) - \frac{\sqrt{a^2+b^2}}{b^2}E(\xi,\, s) + \frac{(a^2+b^2)y}{b^2\sqrt{(a^2+y^2)(y^2-b^2)}},$
$y > b > 0.$

5. $\displaystyle\int_y^\infty \sqrt{\frac{x^2-b^2}{(x^2-a^2)^3}}\,dx = \frac{1}{a}[F(\nu,\, t) - E(\nu,\, t)] + \frac{1}{y}\sqrt{\frac{y^2-b^2}{y^2-a^2}}, \quad y > a > b > 0.$

6. $\displaystyle\int_y^\infty \sqrt{\frac{x^2-a^2}{(x^2-b^2)^3}}\,dx = \frac{a}{b^2}[F(\nu,\, t) - E(\nu,\, t)] + \frac{1}{y}\sqrt{\frac{y^2-a^2}{y^2-b^2}}, \quad y \ge a > b > 0.$