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

T2.19B. Integrands of the form $\dfrac{1}{\sqrt{(a^2 \pm x^2)^5\,(b^2 \pm x^2)}}$ on the intervals (y, b) and (b, y).

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

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

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

1. $$\int_y^b \frac{dx}{\sqrt{(a^2 + x^2)^5 (b^2 - x^2)}} = \frac{1}{3a^4\sqrt{(a^2 + b^2)^3}}\{(4a^2 + 2b^2)E(\delta,\, r) - a^2 F(\delta,\, r)\}$$
$$- \frac{y[a^2(5a^2 + 3b^2) + y^2(4a^2 + 2b^2)]}{3a^4(a^2 + b^2)^2}\sqrt{\frac{b^2 - y^2}{(a^2 + y^2)^3}}, \quad b > y > 0.$$

2. $$\int_b^y \frac{dx}{\sqrt{(a^2 + x^3)^5 (x^2 - b^2)}} = \frac{1}{3a^4\sqrt{(a^2 + b^2)^3}}\left\{(3a^2 + 2b^2)F(\varepsilon,\, s) - (4a^2 + 2b^2)E(\varepsilon,\, s)\right\}$$
$$+ \frac{(3a^2 + b^2)y^2 + 2(2a^2 + b^2)a^2}{3a^2(a^2 + b^2)^2 y}\sqrt{\frac{y^2 - b^2}{(y^2 + a^2)^3}}, \quad y > b > 0.$$

3. $$\int_y^b \frac{dx}{\sqrt{(a^2 - x^2)^5 (b^2 - x^2)}} = \frac{2(2a^2 - b^2)}{3a^3(a^2 - b^2)^2}E(\zeta,\, r) - \frac{1}{3a^3(a^2 - b^2)}F(\zeta,\, t)$$
$$+ \frac{y}{3a^2(a^2 - b^2)(a^2 - y^2)}\sqrt{\frac{b^2 - y^2}{a^2 - y^2}}, \quad a > b > y \geq 0.$$

$$4. \int_b^y \frac{dx}{\sqrt{(a^2-x^2)^5(x^2-b^2)}} = \frac{1}{3a^3(a^2-b^2)^2}\left\{(3a^2-b^2)F(\kappa,\,q)-(4a^2-2b^2)E(\kappa,\,q)\right\}$$

$$+\frac{2(2a^2-b^2)a^2+(b^2-3a^2)y^2}{3a^2y(a^2-b^2)^2(a^2-y^2)}\sqrt{\frac{y^2-b^2}{a^2-y^2}}, \quad a>y>b>0.$$