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

T2.17C. Integrands of the form $\dfrac{x^n}{\sqrt{(a^2 \pm x^2)^3\,(b^2 \pm x^2)}}$ and $\dfrac{x^n}{\sqrt{(a^2 \pm x^2)\,(b^2 \pm x^2)^3}}$ for $n = 0, 2$, on the interval $(0, y)$.

Notation used: $\alpha = \arctan\dfrac{y}{b}$, $\gamma = \arcsin\dfrac{y}{b}\sqrt{\dfrac{a^2+b^2}{a^2+y^2}}$, $\eta = \arcsin\dfrac{y}{b}$,

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

1. $$\int_0^y \frac{dx}{\sqrt{(x^2+a^2)(x^2+b^2)^3}} = \frac{1}{ab^2(a^2-b^2)}\{a^2E(\alpha,\,q) - b^2F(\alpha,\,q)\}, \quad a > b;\ y > 0.$$

2. $$\int_0^y \frac{dx}{\sqrt{(x^2+a^2)^3(x^2+b^2)}} = \frac{1}{a(a^2-b^2)}\{F(\alpha,\,q) - E(\alpha,\,q)\} + \frac{y}{a^2\sqrt{(y^2+a^2)(y^2+b^2)}}, \quad a > b;\ y > 0.$$

3. $$\int_0^y \frac{dx}{\sqrt{(a^2+x^2)^3(b^2-x^2)}} = \frac{1}{a^2\sqrt{a^2+b^2}}E(\gamma,\,r), \quad b \geq y > 0.$$

4. $$\int_0^y \frac{dx}{\sqrt{(a^2+x^2)(b^2-x^2)^3}} = \frac{1}{b^2\sqrt{a^2+b^2}}\{F(\gamma,\,r) - E(\gamma,\,r)\} + \frac{y}{b^2\sqrt{(a^2+y^2)(b^2-y^2)}}, \quad b > y > 0.$$

5. $$\int_0^y \frac{dx}{\sqrt{(a^2-x^2)^3(b^2-x^2)}} = \frac{1}{a^2(a^2-b^2)}\left\{aE(\eta,\,t) - y\sqrt{\frac{b^2-y^2}{a^2-y^2}}\right\}, \quad a > b \geq y > 0.$$

6. $$\int_0^y \frac{dx}{\sqrt{(a^2-x^2)(b^2-x^2)^3}} = \frac{1}{ab^2}F(\eta,\,t) - \frac{1}{b^2(a^2-b^2)}\left\{aE(\eta,\,t) - y\sqrt{\frac{a^2-y^2}{b^2-y^2}}\right\},\quad a>b>y>0.$$

7. $$\int_0^y \frac{x^2\,dx}{\sqrt{(x^2+a^2)(x^2+b^2)^3}} = \frac{a}{a^2-b^2}\{F(\alpha,\,q) - E(\alpha,\,q)\},\quad a>b,\ y>0.$$

8. $$\int_0^y \frac{x^2\,dx}{\sqrt{(x^2+a^2)^3(x^2+b^2)}} = \frac{1}{a(a^2-b^2)}\{a^2E(\alpha,\,q) - b^2F(\alpha,\,q)\} - \frac{y}{\sqrt{(a^2+y^2)(b^2+y^2)}},\quad a>b,\ y>0.$$

9. $$\int_0^y \frac{x^2\,dx}{\sqrt{(a^2+x^2)^3(b^2-x^2)}} = \frac{1}{\sqrt{a^2+b^2}}\{F(\gamma,\,r) - E(\gamma,\,r)\},\quad b\ge y>0.$$

10. $$\int_0^y \frac{x^2\,dx}{\sqrt{(a^2+x^2)(b^2-x^2)^3}} = \frac{y}{\sqrt{(a^2+y^2)(b^2-y^2)}} - \frac{1}{\sqrt{a^2+b^2}}E(\gamma,\,r),\quad b>y>0.$$

11. $$\int_0^y \frac{x^2\,dx}{\sqrt{(a^2-x^2)^3(b^2-x^2)}} = \frac{1}{a^2-b^2}\left\{aE(\eta,\,t) - y\sqrt{\frac{b^2-y^2}{a^2-y^2}}\right\} - \frac{1}{a}F(\eta,\,t),\quad a>b\ge y>0.$$

12. $$\int_0^y \frac{x^2\,dx}{\sqrt{(a^2-x^2)(b^2-x^2)^3}} = \frac{1}{a^2-b^2}\left\{y\sqrt{\frac{a^2-y^2}{b^2-y^2}} - aE(\eta,\,t)\right\},\quad a>b>y>0.$$