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

T3.02C. Powers of x, binomials of the form $(a+b\,x)$ and polynomials in x on the interval $(1,\infty)$, (y,∞) and (a,∞).

1. $$\int_1^\infty \frac{x^{\mu-1}\left[(x-\sqrt{x^2-1})^\nu+(x-\sqrt{x^2-1})^{-\nu}\right]}{\sqrt{x^2-1}}\,dx=2^{-\mu}\mathrm{B}\left(\frac{1-\mu+\nu}{2},\,\frac{1-\mu-\nu}{2}\right),$$
$$\Re\{\mu\}<1+\Re\{\nu\}.$$

2. $$\int_y^\infty (x^{-\lambda}(x-y)^{\mu-1}(x^2+\beta^2))^\nu\,dx$$
$$=y^{\mu-\lambda+2\nu}\frac{\Gamma(\mu)\Gamma(\lambda-\mu-2\nu)}{\Gamma(\lambda-2\nu)}\,{}_3F_2\left(-\nu,\,\frac{\lambda-\mu}{2}-\nu,\,\frac{1+\lambda-\mu}{2}-\nu;\,\frac{\lambda}{2}-\nu,\,\frac{1+\lambda}{2}-\nu;\,-\frac{\beta^2}{y^2}\right),$$
$$|y|>|\beta|\text{ or }\Re\{\beta/y\}>0,\ 0<\Re\{\mu\}<\Re\{\lambda-2\nu\}.$$

3. $$\int_y^\infty \frac{(x-y)^{\mu-1}(\sqrt{x+1}-\sqrt{x-1})^{2\nu}}{\sqrt{x^2-1}}\,dx=\frac{2^{\nu+1/2}}{\sqrt{\pi}}\,e^{i\pi(\mu-1/2)}\,(y^2-1)^{(2\mu-1)/4}Q_{\nu-1/2}^{(1/2-\mu)}(y),$$
$$|\arg(y-1)|<\pi,\ 0<\Re\{\mu\}<1+\Re\{\nu\}.$$

4. $$\int_a^\infty (x-\sqrt{x^2-b^2})^n\,dx=\frac{b^2}{2(n-1)}(a-\sqrt{a^2-b^2})^{n-1}-\frac{1}{2(n+1)}(a-\sqrt{a^2-b^2})^{n+1},$$
$$0<b\le a,\ n\ge 2.$$

5. $$\int_a^\infty (\sqrt{x^2+1}-x)^n\,dx=\frac{(\sqrt{a^2+1}-a)^{n-1}}{2(n-1)}+\frac{(\sqrt{a^2+1}-a)^{n+1}}{2(n+1)},\quad n\ge 2.$$

6. $$\int_a^\infty (x-a)^m(x-\sqrt{x^2-a^2})^n\,dx=\frac{n\cdot(n-m-2)!(2m+1)!\,a^{m+n+1}}{2^m(n+m+1)!},\quad a>0,\ n\ge m+2.$$
