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

T3.24C. Integrands involving exponentials and rational functions on the intervals (y,∞) and $(1,\infty)$.

1. $$\int_y^\infty x^n e^{-\mu x}\,dx = e^{-y\mu}\sum_{k=0}^{n}\frac{n!}{k!}\,\frac{y^k}{\mu^{n-k+1}} = \mu^{-n-1}\,\gamma(n+1,\mu y),$$
$$y>0,\ \Re\{\mu\}>0,\ n=0,1,2,\ldots.$$

2. $$\int_y^\infty \frac{e^{-px}\,dx}{x^{n+1}} = (-1)^{n+1}\frac{p^n\,\mathrm{Ei}(-py)}{n!} + \frac{e^{-py}}{y^n}\sum_{k=0}^{n-1}\frac{(-1)^k p^k y^k}{n(n-1)\ldots(n-k)},\quad p>0.$$

3. $$\int_y^\infty \frac{e^{-\mu x}\,dx}{x+\beta} = -e^{\beta\mu}\,\mathrm{Ei}\,(-\mu y-\mu\beta),\quad y\ge 0,\ |\arg(y+\beta)|<\pi,\ \Re\{\mu\}>0.$$

4. $$\int_y^\infty \frac{e^{-px}\,dx}{a-x} = e^{-pa}\,\mathrm{Ei}\,(pa-py),\quad p>0,\ a<y,$$
$$\text{for } a>y, \text{replace } \mathrm{Ei}(pa-py) \text{ by } \overline{\mathrm{Ei}}(pa-py).$$

5. $$\int_y^\infty \frac{e^{-\mu x}\,dx}{(x+\beta)^n} = e^{-y\mu}\sum_{k=1}^{n-1}\frac{(k-1)!(-\mu)^{n-k-1}}{(n-1)!(y+\beta)^k} - \frac{(-\mu)^{n-1}}{(n-1)!}e^{\beta\mu}\,\mathrm{Ei}\,[-(y+\beta)\mu],$$
$$n\ge 2,\ |\arg(y+\beta)|<\pi,\ \Re\{\mu\}>0.$$

6. $$\int_1^\infty \frac{e^{-\mu x}\,dx}{x} = -\mathrm{Ei}\,(-\mu),\quad \Re\{\mu\}>0.$$
