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

T3.36C. Integrands involving trigonometric functions and rational polynomials of degree k for $k = 1, 2, 3, 4, n$, on the interval $(-\infty, \infty)$.

1. $$\int_{-\infty}^{\infty} \frac{\sin(ax)}{x+\beta}\, dx = \pi e^{ia\beta}, \quad a > 0,\ \Im\{\beta\} > 0.$$

4. $$\int_{-\infty}^{\infty} \frac{\cos(ax)}{x+\beta}\, dx = -i\pi e^{iab}, \quad a > 0,\ \Im\{\beta\} > 0.$$

6. $$\int_{-\infty}^{\infty} \frac{\sin(ax)}{\beta - x}\, dx = -\pi e^{ia\beta}, \quad a > 0,\ \Im\{\beta\} > 0.$$

8. $$\int_{-\infty}^{\infty} \frac{\cos(ax)}{\beta - x}\, dx = -i\,\pi e^{i\,a\beta}, \quad a > 0,\ \Im\{\beta\} > 0.$$

4. $$\int_{-\infty}^{\infty} \frac{x\,\sin(ax)}{\beta^2 + x^2}\, dx = \pi e^{-a\beta}, \quad a > 0,\ \Re\{\beta\} > 0.$$

6. $$\int_{-\infty}^{\infty} \frac{\sin[a(b-x)]}{c^2 + x^2}\, dx = \frac{\pi}{c} e^{-ac}\,\sin(ab), \quad a > 0,\ b > 0,\ c > 0.$$

7. $$\int_{-\infty}^{\infty} \frac{\cos[a(b-x)]}{c^2 + x^2}\, dx = \frac{\pi}{c} e^{-ac}\,\cos(ab), \quad a > 0,\ b > 0,\ c > 0.$$

12. $$\int_{-\infty}^{\infty} \frac{\sin(ax)}{x(x-b)}\, dx = \pi \frac{\cos(ab) - 1}{b}, \quad a > 0,\ b > 0.$$

13. $$\int_{-\infty}^{\infty} \frac{b+cx}{p+2qx+x^2} \sin(ax)\,dx = \left(\frac{cq-b}{\sqrt{p-q^2}} \sin(aq) + c\cos(aq) \right) \pi e^{-a\sqrt{p-q^2}}, \qquad a>0,\ p>q^2.$$

14. $$\int_{-\infty}^{\infty} \frac{b+cx}{p+2qx+x^2} \cos(ax)\,dx = \left(\frac{b-cq}{\sqrt{p-q^2}} \cos(aq) + c\sin(aq) \right) \pi e^{-a\sqrt{p-q^2}}, \qquad a>0,\ p>q^2.$$

15. $$\int_{-\infty}^{\infty} \frac{\cos[(b-1)t] - x\cos(bt)}{1-2x\cos t + x^2} \cos(ax)\,dx = \pi\, e^{-a\sin t} \sin(bt + a\cos t), \quad a>0,\ t^2<\pi^2.$$
