



9. 
$$\int_{-\infty}^{\infty} \frac{y(t) dt}{t-x} = f(x).$$

Solution: 
$$y(x) = -\frac{1}{\pi^2} \int_{-\infty}^{\infty} \frac{f(t) dt}{t-x}.$$

The integral equation and its solution form a Hilbert transform pair (in the asymmetric form). Singular integrals are understood in the sense of the Cauchy principal value.

### References

- Ditkin, V. A. and Prudnikov, A. P.**, *Integral Transforms and Operational Calculus*, Pergamon Press, New York, 1965.  
**Polyanin, A. D. and Manzhirov, A. V.**, *Handbook of Integral Equations*, CRC Press, Boca Raton, 1998.