THE DIREC DELTA FUNCTION

Def: The Dirac delta "function" \( \delta(t) \) is given by

and satisfies the property that for any function \( f \) which is continuous in an open interval containing 0,

Ex 1: Compute \( \mathcal{L}\{\delta(t-a)\}(s) \).

Ex 2: Suppose a mass-spring system is modeled by the IVP

\[ y'' + y = -\delta(t - 3\pi), \quad y(0) = 1, \quad y'(0) = 0. \]

Solve for the displacement \( y(t) \) from equilibrium.
Ex 3: A mass-spring system is governed by the IVP

\[ y'' - y = \delta(t - 3) + \delta(t - 9), \quad y(0) = 0, \quad y'(0) = 2. \]

Solve for the displacement \( y(t) \) from equilibrium.