1. Plot the signals
   \[ x(t) = (t + 1)[u(t + 1) - u(t)] + [u(t) - u(t - 1)] + 2[u(t - 1) - u(t - 2)] \]
   and
   \[ x(t)u(1-t) \] (10 points)

2. Determine whether the following signals are energy signals or power or neither (10 points)
   a. \[ x(t) = e^{-at}u(t), a > 0 \]
   b. \[ x(t) = \sin(\omega_0 t + \theta) \]

3. Verify the following (5 points)
   \[ \delta(t) = \frac{du(t)}{dt} \]

4. Evaluate the following (10 points)
   a. \[ \int_{-\infty}^{\infty} \sin^2 \left( t + \frac{\pi}{2} \right) u(t - 1) \delta(t) dt \]
   b. \[ \int_{-\infty}^{\infty} t \sin^2(t) \delta(\pi - t) dt \]

5. Consider the following input-output system
   \[ y(t) = T\{x(t)\} = \frac{1}{T} \int_{t/2}^{t/2 + T/2} x(\tau) d\tau \]

   Determine whether the systems is (a) linear, (b) time-invariant, and (c) causal.