1. Let \( x(t) = 2e^{-3t}u(t) \). Use Laplace Transform properties to find the Laplace Transform of the following.

   a. \( y(t) = \int_{0}^{t} x(\tau) d\tau \)
   
   b. \( y(t) = x(t - a)u(t - a) \), for fixed \( a > 0 \)
   
   c. \( y(t) = e^{-at}x(t) \)
   
   d. \( y(t) = tx(t) \)
   
   e. \( y(t) = 2e^{-3t}u(t - 1) \)
2. Let \( x(t) = 8\cos(12t)u(t) \). Use Laplace Transform properties to find the Laplace Transform of the following. Sketch pole/zero locations of \( X(s) \) and \( Y(s) \).

a. \( y(t) = \int_0^t x(\tau)d\tau \)

b. \( y(t) = \frac{dx(t)}{dt} \)

c. \( y(t) = e^{-at}x(t) \), for fixed \( a > 0 \)
3. Use Laplace transform properties and partial fraction expansion to find the inverse Laplace transform of the following.

a. \( X(s) = \frac{2}{s(s+3)} \)

b. \( X(s) = \frac{2s}{s+3} \)

c. \( X(s) = \frac{2e^{-4s}}{s+3} \)

d. \( X(s) = \frac{s}{(s+2)^2} \)