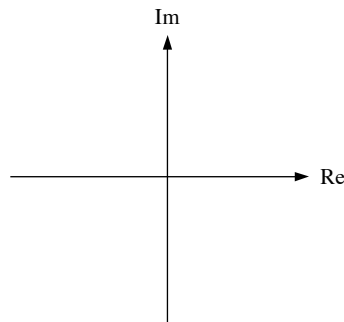




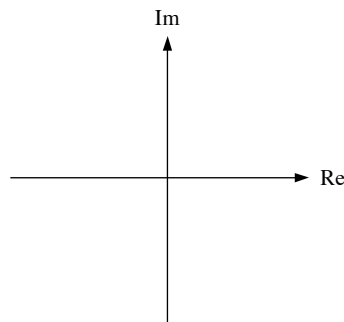
1. a) Find $\mathcal{L}\left\{\left(\int_0^{t-2} \tau e^{-3\tau} d\tau\right)u(t-2)\right\}$.
b) Find $\mathcal{L}\{\delta(t-4)u(t-4) + t\cos(9t)\}$.
2. a) Find $v(t)$ if $V(s) = 2 + \frac{s^2 + s + 4}{s(s^2 + 4)}$.
b) Find $v(t)$ if $V(s) = \frac{16}{s^2 + 10s + 25}$.
3. a) Find $\lim_{t \rightarrow 0} v(t)$ if $V(s) = \frac{(3s^2 + 12)(s - 4)}{[(s + 2)^2 + 5^2](s^2 + 5s + 6)}$.
b) Find $\lim_{t \rightarrow \infty} v(t)$ if $V(s) = \frac{10s^2 + 4}{s^3 + s^2 + s}$.
4. Plot and label the values of the poles and zeros of $V(s)$ in the s plane.

$$V(s) = \frac{3s^2 + 12}{[(s + 2)^2 + 5^2](s^2 + 5s + 6)}$$



5. Plot the poles and zeros of $V(s)$ in the s plane.

$$V(s) = \frac{s^2 - s - 6}{s^3 + 6s^2 + 34s}$$



Answers:

1.a) $\frac{e^{-2s}}{s(s+3)^2}$

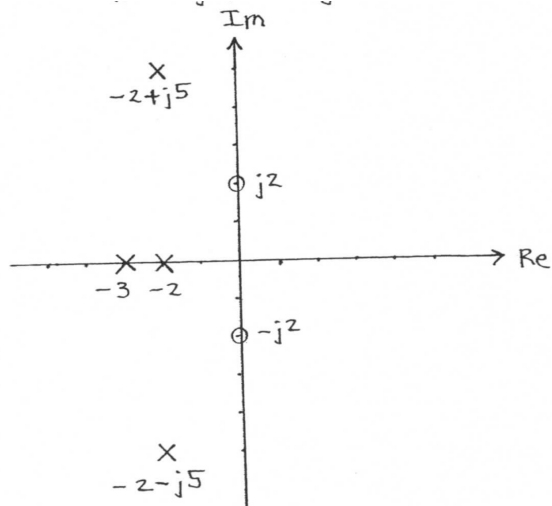
b) $\mathcal{L}\{\delta(t-4)u(t-4) + t \cos(9t)\} = e^{-4s} - \frac{1}{s^2 + 9^2} + \frac{2s^2}{[s^2 + 9^2]^2}$

2.a) $v(t) = 2\delta(t) + [1 + \frac{1}{2}\sin(2t)]u(t)$

b) $v(t) = \mathcal{L}^{-1}\left\{\frac{16}{(s+5)^2}\right\} = [16te^{-5t}]u(t)$

3.a) $\lim_{t \rightarrow 0^+} v(t) = 3$

b) $\lim_{t \rightarrow \infty} v(t) = \lim_{s \rightarrow 0} \frac{10s^2 + 4}{s^2 + s + 1} = 4$



4.
5.

