



1.
 - a) Use delay identity and take $\mathcal{L}\{v(t) = t \cos(t + a - b)\}$
 - b) Use derivative identity and $\mathcal{L}\{t \sin(\omega t) + t^2\} = \mathcal{L}\{t \sin(\omega t)\} + \mathcal{L}\{t^2\}$
 - c) $-\frac{d}{ds} \mathcal{L}\{\cos(\omega t)\} \Big|_{s \rightarrow s+a}$
 - d) Use integration and multiplication by t identities

2. Use trig identity to change $\sin(\omega t)\cos(\omega t)$ into sum of single $\cos(\)$ or $\sin(\)$ terms.

3.
 - a) $3 + 2e^{-6t}$
 - b) $7e^{-4t}[\cos(3t) + \text{another term}]$
 - c) one root of denominator is $s = -11$
 - d) one root of denominator is $s = -8 + j4$

4. Hint: $\sum_{n=0}^N a^n = \frac{a^{N+1} - 1}{a - 1}$

5. Hint: $s = s + 5 - 5$ and use identity for multiplication by e^{-at}