

1. (80 points) Using Tables 3-1 and 3-2, or by direct calculation, determine the following:

- a. The Laplace transform of $(t-2)u(t)$
- b. The inverse Laplace transform of $\frac{e^{-s}}{s^2}$
- c. The Laplace transform of $(t-2)e^{-t}u(t)$
- d. The Laplace transform of $(t-1)e^{-(t-1)}u(t-1)$
- e. The inverse Laplace transform of $\frac{1}{s^2+16}$
- f. The Laplace transform of $e^{-2t} \cos(3t+135^\circ)u(t)$
- g. The Laplace transform of $\frac{d}{dt}\{t^2 e^{-t}u(t)\}$
- h. The Laplace transform of $\frac{d^3 x(t)}{dt^3}$, for a causal signal $x(t)$
- i. The Laplace transform of $r(t-2)$, where $r(t)$ represents the unit ramp signal
- j. The Laplace transform of $(t-1)^2 e^{-2(t-1)} \cos(5(t-1))u(t-1)$

2. (10 points) Calculate the initial and final values for the system $H(s) = \frac{10s+3}{s^2+3s+4}$

3. (10 points) Calculate the initial and final values for the system $H(s) = \frac{s+4}{s^2}$

Suggestion: We have posted a collection of practice problems with solutions on the Blackboard site to help you learn this topic better.