



WEEK IN REVIEW SESSION #7 (SECTIONS 6.1-6.3)

1. Use the definition to find the Laplace transforms of

(a) $f(t) = e^{at}$ where a is a non zero real number.

(b) $f(t) = \sin(bt)$ where b is a non zero real number.

(c) $f(t) = \begin{cases} 5 - t & 0 \leq t < 2 \\ 3t & 2 \leq t. \end{cases}$

(d) $f(t) = t$

(e) $f(t) = t^2$

2. Find the inverse Laplace transform of the following functions.

(a) $F(s) = \frac{4}{(s-2)^5}$

(b) $F(s) = \frac{8s^2 - 4s + 12}{s(s^2 + 4)}$

(c) $F(s) = \frac{2s - 3}{s^2 + 2s + 10}$



3. Use the Laplace transform to solve the given initial value problem

(a) $y'' + 3y' + 2y = 4t$, $y(0) = 1$, $y'(0) = 0$.

(b) $y'' + 9y = \cos 2t$, $y(0) = 0$, $y'(0) = 1$.

(c) $y'' - 2y' + 2y = e^{-t}$, $y(0) = 0$, $y'(0) = 1$.

4. Express $f(t)$ in terms of the unit step function $u_c(t)$ and find its Laplace transform.

(i) $f(t) = \begin{cases} t^2, & 0 \leq t < 2 \\ e^t, & 2 \leq t \end{cases}$

(ii) $f(t) = \begin{cases} 2, & 0 \leq t < 3 \\ 5t^2, & 3 \leq t < 8 \\ 3 \cos(t - 8), & 8 \leq t \end{cases}$