

PRACTICE MIDTERM I

1. Determine Laplace transform of $te^{5t} \cos(t) + t$.
2. Determine Laplace transform of $t^3 \cos(t) - 1$.
3. Determine the inverse Laplace transform of $\frac{7s^2+23s+30}{(s-2)(s^2+2s+5)}$.
4. Solve using Laplace transformation $y'' - 3y' + 2y = \cos(t)$, $y(0) = 0$, $y'(0) = -1$.
5. Determine the inverse Laplace transform of $\frac{e^{-3s}(s-5)}{(s+1)(s+2)}$.
6. Find the inverse Laplace transform of $\frac{s+1}{(s^2+1)^2}$.
7. Solve $y'' + 2y' + 2y = \delta(t - \pi)$, $y(0) = 1$, $y'(0) = 1$.
8. Solve $x' + y = x$, $2x' + y'' = u(t - 3)$, $x(0) = 0$, $y(0) = 1$, $y'(0) = -1$.

PRACTICE MIDTERM II

1. Determine Laplace transform of $\cos^2(t)$.
2. Determine Laplace transform of $t^2 e^t \sin(t) - t^5$.
3. Determine the inverse Laplace transform of $\frac{7s^2-41s+84}{(s-1)(s^2-4s+13)}$.
4. Solve using Laplace transformation $y'' + y' - y = t^3$, $y(0) = 1$, $y'(0) = 0$.
5. Determine the inverse Laplace transform of $\frac{e^{-s}}{s^2+9}$.
6. Calculate $\cos(t) * \cos(t)$ as a function of t and write down the Laplace transform of it using convolution theorem.
7. Solve $y'' - y = 4\delta(t - 2) + t^2$, $y(0) = 0$, $y'(0) = 2$.
8. Solve $x' - y' = u(t - \pi) \sin(t)$, $x + y' = 0$, $x(0) = y(0) = 1$.