Math 34 Differential Equations Quiz 3 SHOW ALL WORK

1.) Define: The LaPlace transform of $f = \mathcal{L}(f) = \underline{\ \int_0^\infty e^{-st} f(t)dt\ }$

2a.) $\mathcal{L}(0) = \underline{\ 0\ }$

2b.) $\mathcal{L}^{-1}(\frac{3}{(s+1)^2+2}) = \underline{\ \frac{3e^{-t}}{\sqrt{2}} sin(\sqrt{2}t)\ }$

$\mathcal{L}^{-1}(\frac{3}{(s+1)^2+2}) = 3\mathcal{L}^{-1}(\frac{1}{(s+1)^2+2}) = \frac{3}{\sqrt{2}}\mathcal{L}^{-1}(\frac{\sqrt{2}}{(s+1)^2+2}) = \frac{3e^{-t}}{\sqrt{2}}\mathcal{L}^{-1}(\frac{\sqrt{2}}{(s)^2+2}) = \frac{3e^{-t}}{\sqrt{2}} sin(\sqrt{2}t)$

3.) Circle T for True or F for False:

3a.) Suppose $y = f(t)$ is a solution to $y'' + y' + y = cos(2t)$, $y(0) = 0$, $y'(0) = 0$, and suppose $y = g(t)$ is a solution to $y'' + y' + y = cos(2t)$, $y(0) = 100$, $y'(0) = -200$. For large values of t, $f(t) - g(t)$ is very small. T

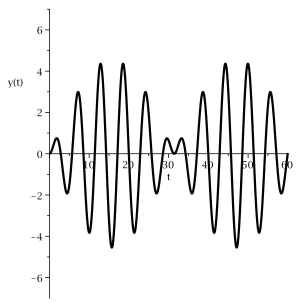
3b.) The initial conditions have a transient effect on the solution to $y'' + y = cos(2t)$. F

3c.) The initial conditions have a transient effect on the solution to $y'' - y' + y = cos(2t)$. F

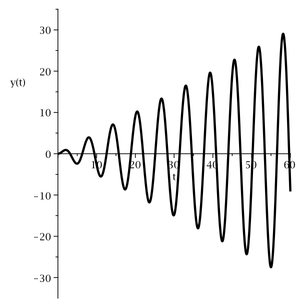
4.) Match the following differential equation initial value problem to its graph:

B = I.) $y'' + y = cos(t)$, $y(0) = 0$, $y'(0) = 0$

A = II.) $y'' + y = cos(1.2t)$, $y(0) = 0$, $y'(0) = 0$



II = A.)



I = B.)