MATH 2340 WARM-UP PROBLEMS

Recall from class on Friday that $\mathcal{L}\{f(t)\}$ is defined as

$$\mathcal{L}\{f(t)\} = \int_0^\infty e^{-st} f(t)\, dt.$$

Using integration by parts, we showed that $\mathcal{L}\{y'(t)\} = sY(s) - y(0)$ where $Y(s) = \mathcal{L}\{y(t)\}$.

1. How do you simplify the expression $\mathcal{L}\{y''(t)\}$ in terms of $Y(s)$ where $Y(s) = \mathcal{L}\{y(t)\}$?

2. Find the Laplace transformation of the solution to the IVP

$$y'' - 6y' + 9y = 4, \quad y(0) = 2, \quad y'(0) = 1.$$

Don't turn over the page just yet...

3. Determine what function would give you the following Laplace transforms. Use the table you were given in class on Friday.

(a) $F(s) = \dfrac{3}{s-1}$

(b) $F(s) = \dfrac{2}{s^2+3s-4}$

(c) $F(s) = \dfrac{4}{s(s-3)^2}$

(d) $F(s) = \dfrac{s-1}{s^2+4s+5}$