Read each problem **very carefully** before starting to solve it and do only what is asked.
Each problem is worth around 5 points. It is necessary to show **all** your work. Correct
answers without explanations are worth 0 points. GOOD LUCK!!

1. [5 points] Compute from scratch (without using any formulas) the Laplace transform of

$$f(t) = 2e^{-3t} - 5e^{3t}.$$

   (If special conditions for convergence are required, point them out during your calculations.)

2. [5 points] Consider the piece-wise defined function

$$f(t) = \begin{cases} t, & \text{if } 0 \le t < 2 \\ -t + 4, & \text{if } 2 \le t < 3 \\ 1, & \text{if } t \ge 3 \end{cases}$$

(a) Sketch the graph of $f(t)$ labeling all important points.

(b) Compute from scratch the Laplace transform $F(s) = \mathcal{L}\{f(t)\}$.