QUIZ 6 - MATH 310 Friday, March 12

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

1. (a) The formal definition of the Laplace transform of a function $f(t)$ is

$$F(s) = \mathcal{L}\{f(t)\} =$$

(b) Use the definition above to compute $\mathcal{L}\{f\}$, where $f(t) = \begin{cases} t, & \text{if } 0 \leq t < 1 \\ 0, & \text{if } 1 \leq t \end{cases}$.

2. (a) Show in detail (do not skip any steps) that, if $F(s) = \mathcal{L}\{f(t)\}$, then

$$\mathcal{L}\{e^{ct} f(t)\} = F(s - c),$$

where c is an arbitrary constant.

(b) In class, we showed that $\mathcal{L}\{\sin at\} = \dfrac{a}{s^2 + a^2}$, for $s > 0$. Use this and Part (a) to find an expression for $\mathcal{L}\{e^{7t} \sin 3t\}$.