Suggested problems 20

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1. Is the given function, $f(t)$, continuous, piecewise continuous, or neither on the interval $0 \leqslant t \leqslant 3$

$$f(t) = \begin{cases} t, & 0 \leqslant t \leqslant 1 \\ 3 - t, & 1 < t \leqslant 2 \\ 1, & 2 < t \leqslant 3 \end{cases}$$

2. Find the Laplace transform of the following functions:

   (a) $f(t) = te^{6t}$;

   (b) $f(t) = \cos(2t)$.

   (c)

$$f(t) = \begin{cases} 1, & 0 \leqslant t < \pi \\ 0, & \pi \leqslant t < +\infty \end{cases}$$

3. Evaluate the following definite integral

$$\int_0^\infty e^{-(s-2)t} \sin(3t).$$