1. Find the Laplace transform of each of the following functions, using the definition of Laplace transform but without using Table 6.2.1.

   (a) $te^t$
   (b) $2^t$
   (c) $t^2$

2. Find the Laplace transform of each of the following functions (you may use Table 6.2.1).

   (a) $e^{2t} \cos(5t) + e^{\pi t}$
   (b) \[
   \begin{cases}
   3 & 0 \leq t < 2 \\
   4 & 2 \leq t < 6 \\
   -2 & t \geq 6
   \end{cases}
   \]
   (c) \[
   \begin{cases}
   \sin(t) & 0 \leq t < \pi \\
   e^t & t \geq \pi
   \end{cases}
   \]

3. Find the inverse Laplace transform of each of the following functions (you may use Table 6.2.1).

   (a) $\frac{1}{s^2 + 4}$
   (b) $\frac{e^t}{s^2 + 4}$
   (c) $\frac{1}{s^2 + 6s + 11}$