Math 274 | Quiz 5 | Name: _____

23 Mar 2018 | Show Appropriate Work | Point Values in $\boxed{\text{boxes}}$.

1. $\boxed{3}$ Express the following function using step functions and determine its Laplace transforms.

$$f(t) = \begin{cases} 1, & t < 2 \\ t, & 2 < t < 3 \\ e^{2t}, & 3 < t \end{cases}$$

2. $\boxed{7}$ Applying the Laplace transform to the initial value problem

$$y'' + 4y = \begin{cases} 0, & t < 2 \\ 8e^{t}, & 2 < t \end{cases}, \qquad y(0) = 1, y'(0) = 2$$

gives

$$Y(s) = \frac{s+2}{s^2+4} + \frac{8e^{4-2s}}{(s-2)(s^2+4)}.$$

Determine $y(t) = \mathscr{L}^{-1}\{Y(s)\}$, the solution to the given initial value problem.