EECS20n, Quiz 3

The quiz will take 15 minutes. Write your response on the sheet. Note that there are three problems on this exam. Please print your name and lab time here:

Last Name ______________ First ______________ Lab time ______________

1. For the Simulink diagram shown below, write a differential equation (with no integrals, just derivatives) that describes the signal $w$.

![Simulink Diagram](image)

initial condition = 1

2. The Simulink diagram in the previous problem can be described as a first-order differential in the following form:

$$\forall t \in \text{Reals}_+, \quad \dot{z}(t) = Az(t).$$

Give a definition of $z$ in terms of $w$ and give $A$. 
3. For the following hybrid system, assume the input is given by

\[ u(t) = \begin{cases} 
  a & \text{if } t = 1 \\
  b & \text{if } t = 2 \\
  \text{absent} & \text{otherwise}
\end{cases} \]

Sketch the output over the range \( t \in [0, 3] \).