1. Find the output $y[n]$ of the system $h[n]$ to the input $x[n]$. Use discrete-time convolution.
   a. $x[n] = \{1, 2, 3\}$ where $n = \{0, 1, 2\}$ and  
      $h[n] = \{1, 2, 3\}$ where $n = \{0, 1, 2\}$
   b. $x[n] = 10\delta[n+1] + 5\delta[n] - 5\delta[n-2] - 10\delta[n-3]$  
      $h[n] = -\delta[n-5] + \delta[n-7]$

2. Perform discrete-time convolution on the following signals and systems. Also perform these convolutions numerically using MATLAB.
   a. $x[n] = 5\delta[n] + 10\delta[n-1] + 15\delta[n-2] + 20\delta[n-3]$  
      $h[n] = \delta[n] + 2\delta[n-1] + 3\delta[n-2] + 4\delta[n-3]$
   b. $x[n] = -\delta[n+5] - 3\delta[n+2] - 4\delta[n-1]$  
      $h[n] = 2\delta[n-100] + 4\delta[n-102]$

3. Compute and plot the convolution for each of the pairs of signals.
   a. $v(t) = 10e^{-10t}u(t)$  
      $x(t) = u(t)$
   b. $v(t) = 2e^{-2t}u(t)$  
      $x(t) = u(t)$
   c. Compare parts (a) and (b). Which is the faster response?  
   d. $v(t) = 2e^{-2t}u(t)$  
      $x(t) = u(t+1)$
      Do part (d) in two ways – use convolution directly; also, use the time delay property and the solution from (b)

4. Find the output signal, $y(t)$, given
   $h(t) = 10e^{-10t}u(t)$  
   $x(t) = e^{-t}u(t)$

5. Find the output signal, $y(t)$, given
   $h(t) = 10e^{-10t}u(t)$  
   $x(t) = u(t) - u(t-1)$
   Also, perform this convolution numerically using MATLAB and the “conv” function.

6. Find the output signal, $y(t)$, given
   $h(t) = e^{-t}u(t)$  
   $x(t) = \sin(t)u(t)$

7. Find the output, $y(t)$, given the input, $x(t)$, and the impulse response, $h(t)$, using convolution.