PROBLEM:

The *unit step* sequence, denoted by $u[n]$, is defined as

$$u[n] = \begin{cases} 0 & n < 0 \\ 1 & n \geq 0 \end{cases}$$

(a) Make a plot of $u[n]$ for $-5 \leq n \leq 12$. Describe the plot of $u[n]$ outside this range.

(b) We can use the unit step sequence as a convenient representation for sequences that are given by formulas over a range of values. For example, make a plot of the sequence

$$x[n] = (.5)^{(n-4)}(u[n-4] - u[n-8])$$

for $-2 \leq n \leq 15$. *Hint: First determine the values of the sequence* $(u[n-4] - u[n-8])$.

(c) Suppose that $x[n]$ in part (b) is the input to a 3-point running average system. Compute and plot $y[n]$, the output of the system for $-2 \leq n \leq 15$.