The continuous time function is seen below in figure 1. This signal is a *sinc* function defined as $y(t) = \text{sinc}(t)$. The Fourier transform of this signal is a rectangle function.

1. Use the function **linspace** to create a vector of time values from -5 $\leq t \leq 5$. Next, plot the function shown in figure 1 using the **sinc** function for $y(t) = \text{sinc}(t)$.
2. Using MATLAB and the command **fft**, show that the Fourier transform pair is indeed a rectangle function. Use the command **fftshift** to center your plot. Don't forget that the Fourier transform is complex, with both magnitude and phase. Your result should be the same as figure 2. Show both your m-file code and plot.
3. Using the same time values, plot the continuous time function defined as $y(t) = \text{sinc}(2t)$.
4. Plot the transform pair for this signal.

Questions:

1. What is the "ringing" caused from seen on top of the rectangular pulse shown in figure 2?
2. In step 3 above, the sinc function gets compressed or smaller by a factor of 2. What happened to the rectangular pulse in the frequency domain? What property does this represent?
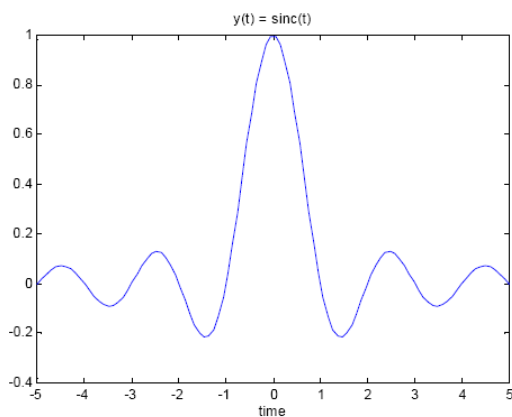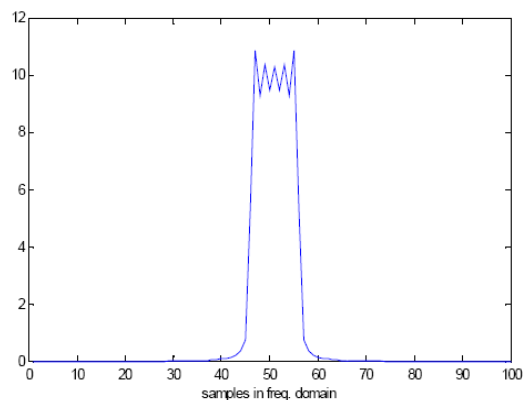

Figure 1

Figure 2