1. Write down the expressions for the PM modulated signals and use MATLAB to plot them.

2. Evaluate and plot the different functions of Example 3.4 in the book (page 128) using Matlab.
   More specifically, write a Matlab program to evaluate and plot:
   - The message signal $m(t)$
   - The phase deviation function $\phi(t)$
   - The frequency deviation function $\frac{1}{2\pi} \frac{d\phi(t)}{dt}$
   - The modulated FM carrier $x_c(t)$ for different values of $\beta = \frac{Af_d}{f_m}$

Comment:
You need to try different values for the carrier frequency $f_c$ in order to clearly observe the change in the instantaneous frequency function $f_i(t)$. You should define the carrier frequency $f_c$ and the message frequency $f_m$ as variables in your program and try different values. Include your program and the outputs for two different values of $f_c$, $f_m$ and $f_d$. Let $A = 1$ and $A_c = 1$.

%you can write a function in MATLAB as follows;
>>function [m,phi,freqdev,xc]=narrowband_fm(wm,wc,fd);
%the outputs are the message, phase deviation, frequency deviation and the %modulated signal;
%the inputs are the frequency of message and carrier wave, the frequency %deviation constant;
>>t=[0:.01:1];
>>m=cos(wm*t);
>>beta=(fd/fm);
>>phi=_____________;%write the phase deviation function;
>>freqdev=_____________;%write the frequency deviation function;
>>subplot(411);
>>plot(t,m);
>>subplot(412);
>>plot(t,phi);
>>subplot(413);
>>plot(t,freqdev);
>>subplot(414);
4. An angle modulated signal has the form $x_c(t) = 100\cos(2\pi f_c t + 4\sin 2000\pi t)$ where $f_c = 10MHz$.
   a. Determine the average transmitted power.
   b. Determine the peak-phase deviation.
   c. Determine the peak-frequency deviation.
   d. Is this an FM or a PM signal? Explain.