1. A Gaussian white noise source with two-sided power spectral density $S_i(f) = n_0/2$ is applied to the band pass filter shown below. Filter the output noise power, $N_0$, in terms of $n_0$ and $R,L,C$.

![Band Pass Filter Diagram]

2. (a) An amplifier with 20 dB of power gain has a third-order intercept of 30dBm at the output. If the input consists of a 0dBm signal at 1 GHz and another 0 dBm signal at 1.05GHz, what will be the output power of the third-order products at 1.1 GHz and 0.95 GHz? (b) The same as problem 1(a) except that the input signal at 1GHz increases in power to 10 dBm while the input signal at 1.05 GHz remains 0 dBm.

3. Consider the following receiver architecture with the individual specs shown for each block. Determine the total noise figure (NF) dB. Also determine the total sensitivity. The specs for the IF filter and BPF3 are considered together as block 5. If the total IIP3 of the receiver is -15 dBm find the SFDR of the receiver.

![Receiver Architecture Diagram]