## PROBLEM:

When a discrete-time signal is played out through a D/A converter and a speaker, we hear sounds over a well-defined frequency range. For this problem assume that the rate of the D/A converter is 8 kHz.

(a) A digital sinusoid is created using the formula: $y[n] = 44\cos(0.1\pi n + 0.3\pi)$ and then played out through the 8 kHz D/A. What analog frequency (in Hertz) is heard?

(b) A digital chirp signal is synthesized according to the following formula:

$$x[n] = \Re e\{e^{j\theta[n]}\} = \cos(0.0003\pi n^2) \qquad \text{for } n = 0, 1, 2, \ldots, 4000$$

Make a plot of the instantaneous *analog* frequency (in Hertz) versus time for the analog signal. Make sure that you determine the length of the signal in seconds. Does aliasing affect your answer?