PROBLEM:

A chirp signal is synthesized according to the following formula:

$$x(t) = \Re e\{e^{j600\pi t^2} \cos(1600\pi t)\} \qquad \text{for } 0 \leq t \leq 5$$

(a) Determine the formula for the instantaneous frequency of the chirp. Make a plot of the instantaneous frequency versus time.

(b) Derive a formula for a chirp signal whose instantaneous frequency starts at 3 kHz and falls linearly to 0 kHz in 2 seconds.