

## PROBLEM:

Try working this problem after you have worked Problem 3.1. It should be easy.

Consider the signal

$$x(t) = 20[\sin(1000\pi t)]^2.$$

- Using the inverse Euler relation for the sine function, express  $x(t)$  as a sum of complex exponential signals with positive and negative frequencies.
- Use your result in part (a) to express  $x(t)$  in the form  $x(t) = A_0 + A_1 \cos(\omega_0 t)$ .
- Determine the period  $T_0$  of  $x(t)$  and sketch its waveform over the interval  $-T_0 \leq t \leq 2T_0$ . Carefully label the graph.
- Plot the spectrum of  $x(t)$ .