PROBLEM:

Suppose that a discrete-time signal $x[n]$ is given by the formula

$$x[n] = 10\cos(0.25\pi n + \pi/2)$$

and that it was obtained by sampling a continuous-time signal at a sampling rate of $f_s = 1000$ samples/second.

(a) Determine two *different* continuous-time signals $x_1(t)$ and $x_2(t)$ whose samples are equal to $x[n]$; i.e., find $x_1(t)$ and $x_2(t)$ such that $x[n] = x_1(nT_s) = x_2(nT_s)$ if $T_s = 0.001$. Both of these signals should have a frequency less than 1000 Hz. Give a formula for each signal.

(b) If $x[n]$ is given by the equation above, what signal will be reconstructed by an ideal D-to-C converter operating at sampling rate 1000 samples/second?