PROBLEM:

Each of the following signals may be simplified, and expressed as a single sinusoid of the form: $A\cos(\omega t + \phi)$. For each signal, draw a vector diagram of the complex amplitudes (phasors), and use vector addition to estimate the amplitude A and phase ϕ of the sinusoid. Then use the phasor addition theorem to find the exact values for A and ϕ.

(a) $x_a(t) = 2\cos(40\pi t + 3\pi/4) + 2\cos(40\pi t - 3\pi/4)$

(b) $x_b(t) = \sqrt{2}\cos(200\pi t + 21\pi) + 2\cos(200\pi t - 24.5\pi) + \sqrt{3}\cos(200\pi t + 3\pi)$

(c) $x_c(t) = 10\cos(60\pi t + \pi/6) + 10\cos(60\pi t + 5\pi/6) + 10\cos(60\pi t - \pi/2)$