ME345W Fall 2013 Aliasing Homework

A certain "music" signal is comprised of five "tones":

$$v(t)=0.5\sin(10000\pi t) + 0.4\sin(20000\pi t) + 0.2\sin(36000\pi t) + 0.3\sin(48000\pi t) + 0.4\sin(50000\pi t)$$

(Recall the form of a sinewave signal as: $f(t) = A \sin(2\pi ft)$.)

Answer the following:

a) What frequencies are present in the original signal?
b) If v(t) is sampled at 44.1kHz, what frequencies will be present in the sampled version of the signal?
c) What is the minimum frequency at which v(t) could be sampled to avoid aliasing?