An amplitude modulated (AM) cosine wave is represented by the formula

$$
x(t)=[12+7 \sin (\pi t-\pi / 3)] \cos (13 \pi t)
$$

(a) Use phasors to show that $x(t)$ can be expressed in the form:

$$
x(t)=A_{1} \cos \left(\omega_{1} t+\phi_{1}\right)+A_{2} \cos \left(\omega_{2} t+\phi_{2}\right)+A_{3} \cos \left(\omega_{3} t+\phi_{3}\right)
$$

where $\omega_{1}<\omega_{2}<\omega_{3}$; i.e., find $A_{1}, A_{2}, A_{3}, \phi_{1}, \phi_{2}, \phi_{3}, \omega_{1}, \omega_{2}, \omega_{3}$ in terms of $A, \omega_{0}$, and $\omega_{c}$.
(b) Sketch the two-sided spectrum of this signal on a frequency axis. Be sure to label important features of the plot. Label your plot in terms of the numerical values of the $A_{i}{ }^{\prime}$ 's $\phi_{i}$ 's and $\omega_{i}$ 's.

