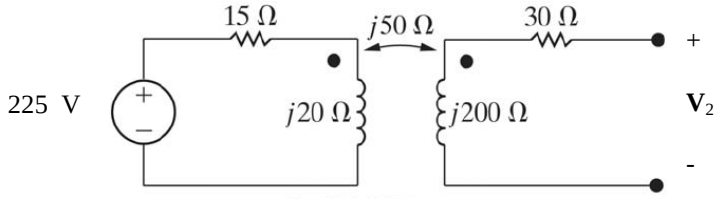
Homework 8: Supplemental Problem

Please answer the following for the sinusoidal steady-state circuit shown below

(a) Find the voltage phasor $\mathbf{V}_2$ in the *linear* transformer circuit and express it in polar form (magnitude and angle).



(b) Replace the linear transformer by an *ideal* transformer with turns ratio 1:*a* where $a = \sqrt{\frac{\omega L_2}{\omega L_1}} = \sqrt{\frac{200}{20}} = \sqrt{10}$. Repeat part (a) and find the voltage phasor $\mathbf{V}_2$.

Compare your answers. What is the value of $k = \frac{M}{\sqrt{L_1 L_2}}$? How accurate is the ideal transformer model for the circuit in part (a) with open-circuit load?