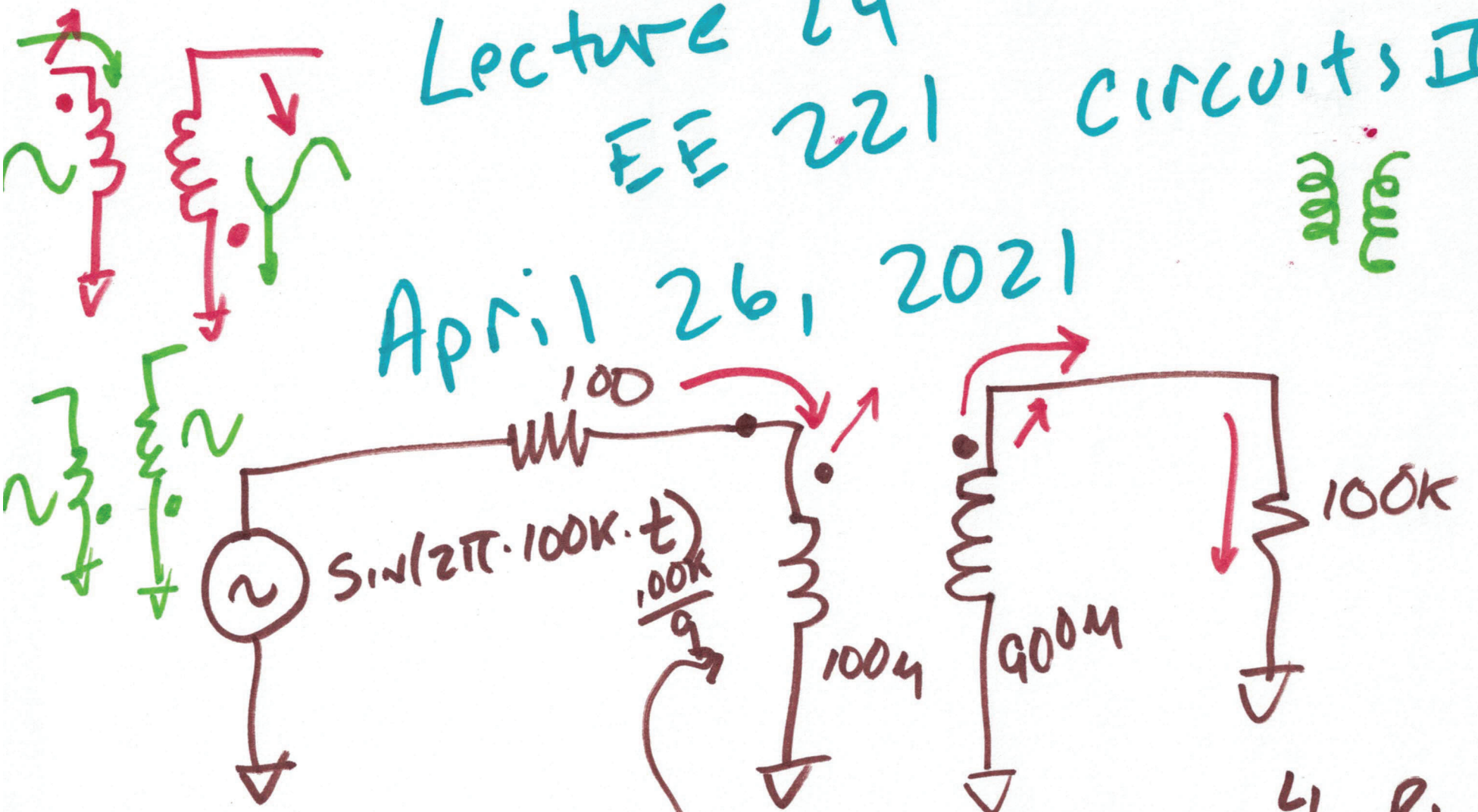
Lecture 24
EE 221 Circuits II

April 26, 2021

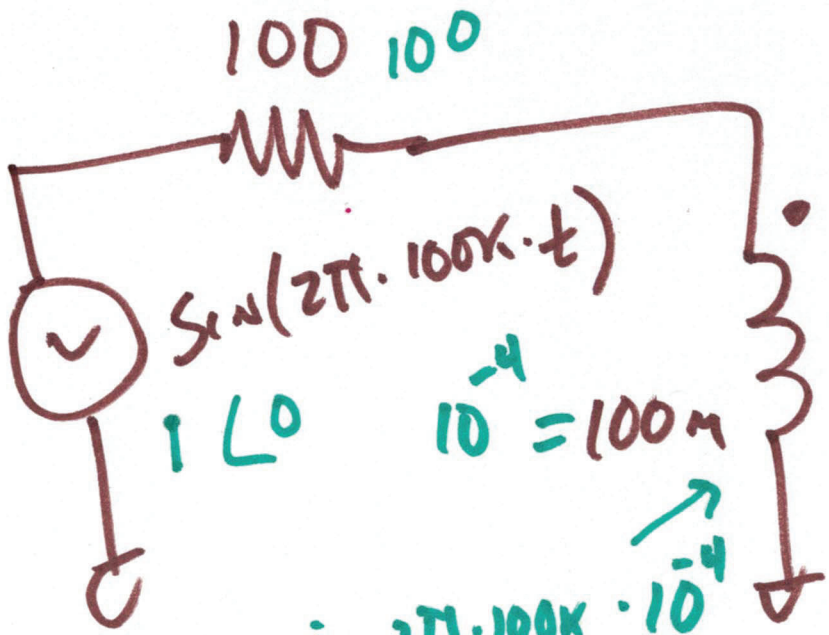


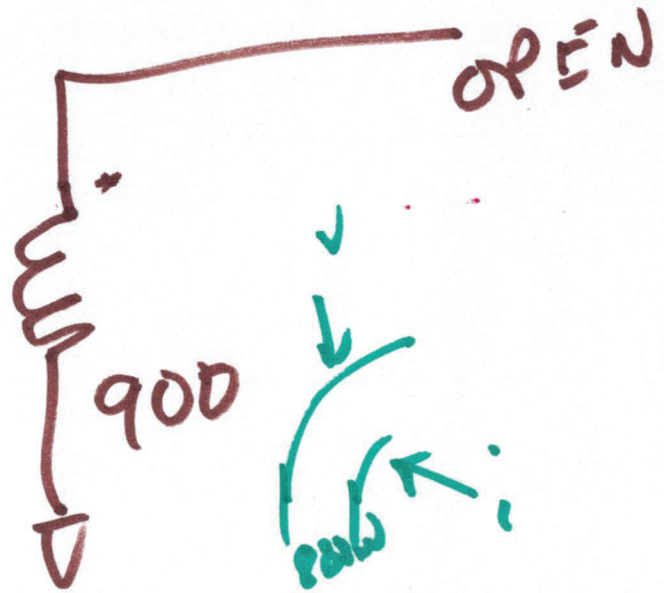
$$R_{IN} = \left(\frac{N_1}{N_2}\right)^2 \cdot R_L = \frac{L_1}{L_2} \cdot R_L$$

$$\sqrt{\frac{L_1}{L_2}} = \frac{N_1}{N_2}$$

$\frac{1}{100K} = 10\mu s$ MAgnetizing inductance

Load $i = 0$





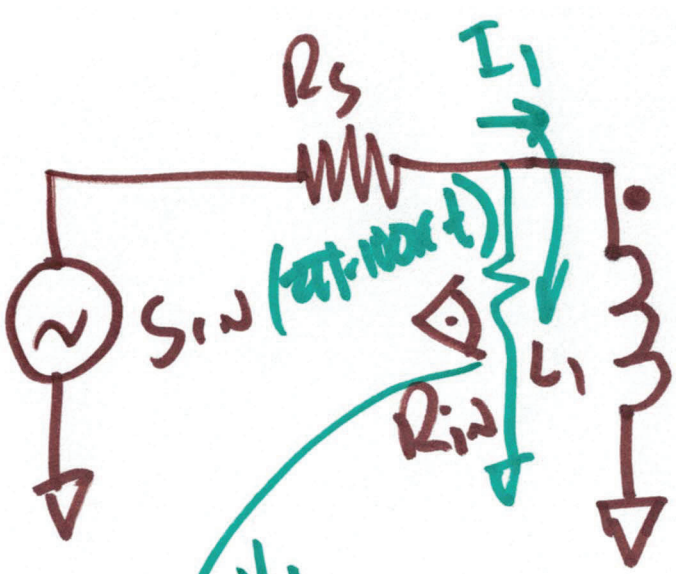
$$i = \frac{1 \angle 0}{100 + j62.8}$$

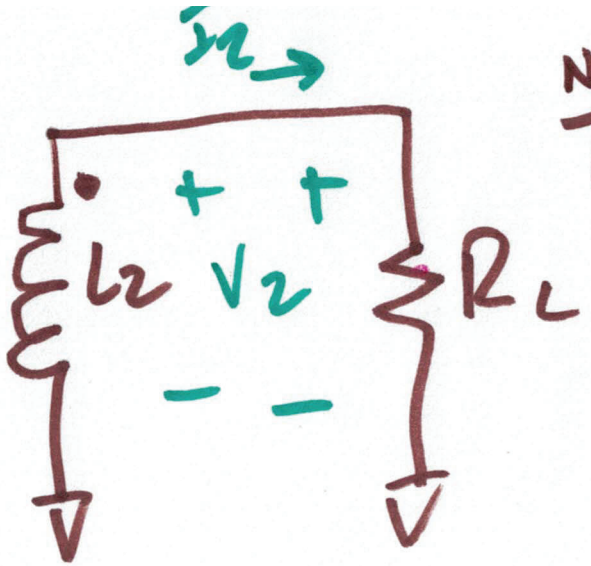
$$118 \angle -32.1$$

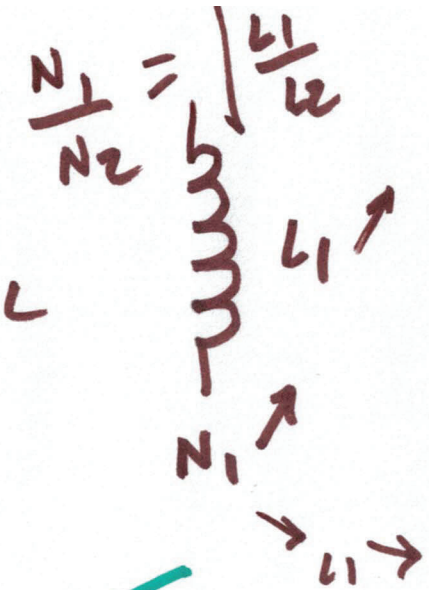
$$i = 8.47mA \sin(2\pi \cdot 100t - 32.1)$$

$$\frac{t_d}{10\mu} \cdot 360 = 32.$$

$$t_d = 888ns$$







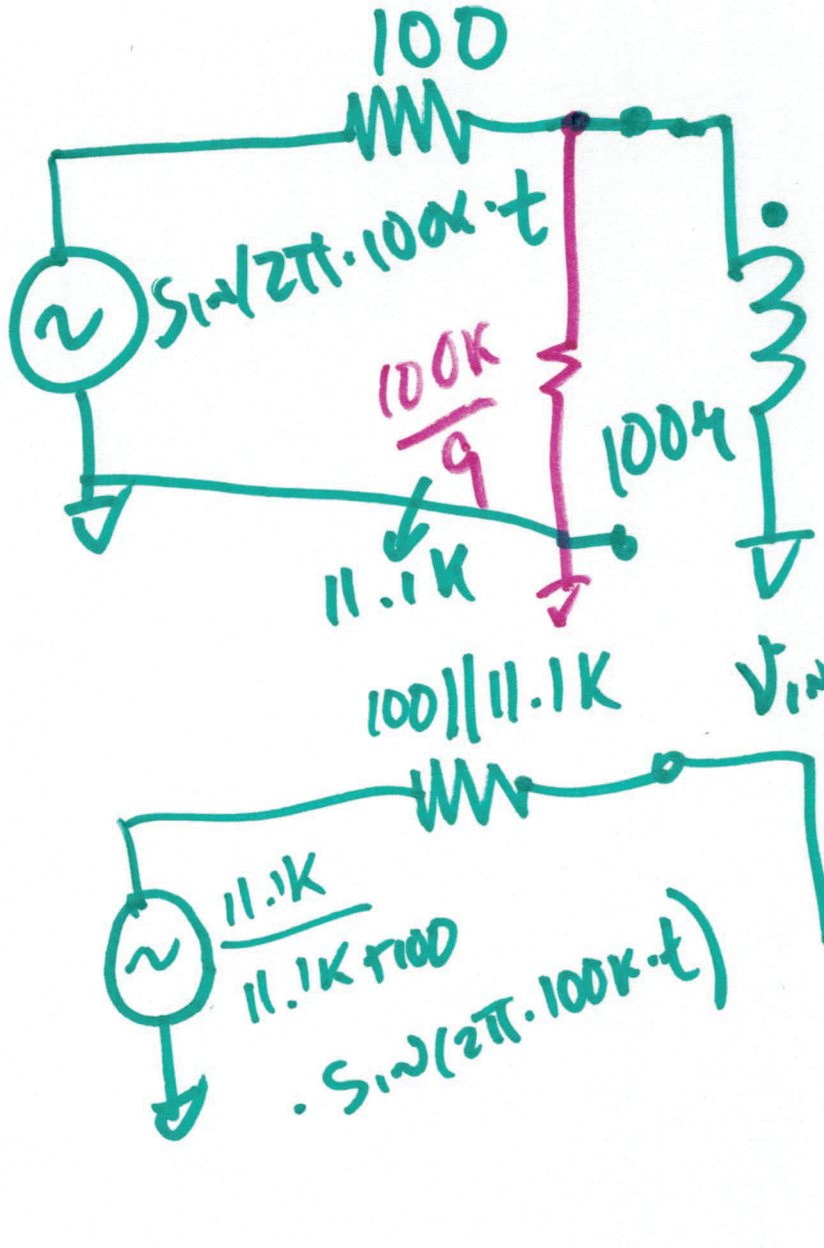
$$R_{in} = \frac{V_1}{I_1}$$

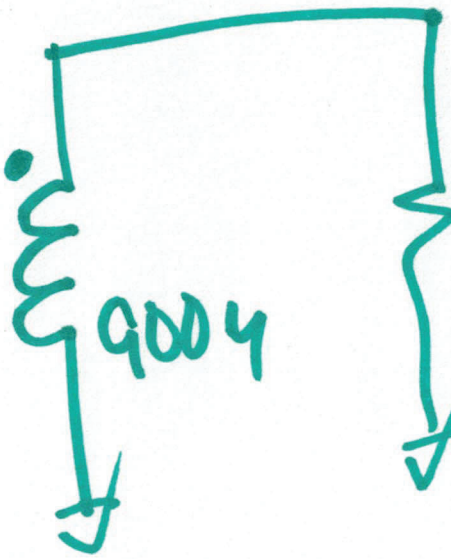
$$\frac{V_1}{V_2} = \frac{I_2}{I_1} = \frac{N_1}{N_2} = \sqrt{\frac{L_1}{L_2}}$$

$$R_L = \frac{V_2}{I_2}$$

$$R_{IN} = \frac{V_1}{I_1} = \frac{V_2 I_2}{I_1} = \frac{V_2 \cdot N_1/N_2}{I_2 \cdot N_2/N_1}$$

$$= \frac{V_2}{I_2} \cdot \left(\frac{N_1}{N_2}\right)^2$$

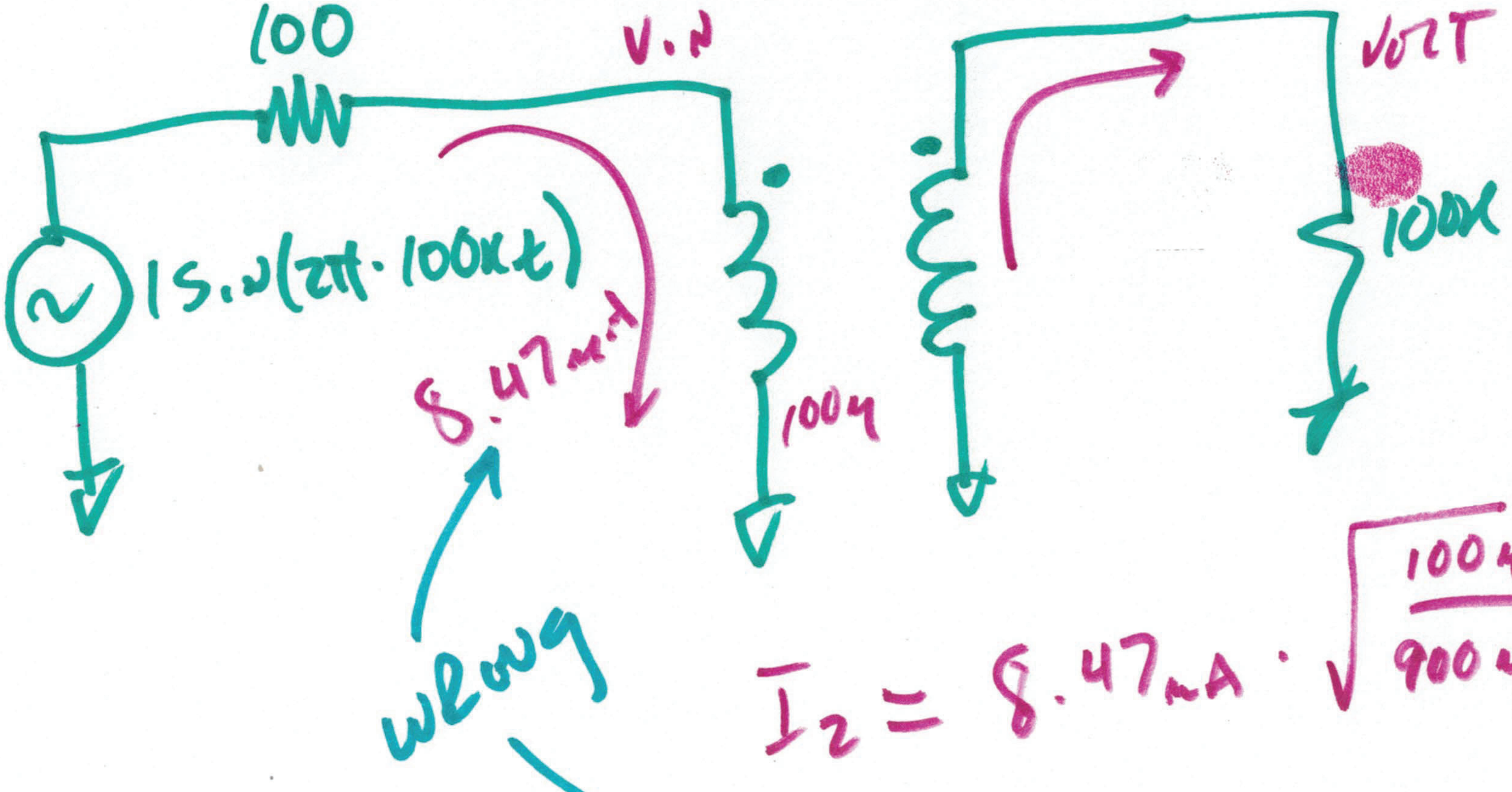




$$R_{IN} = \frac{V_2}{I_2} \cdot \left(\frac{N_1}{N_2}\right)^2$$

$$\underbrace{100K}_{\frac{1}{9}} \left(\sqrt{\frac{L_1}{L_2}}\right)^2$$

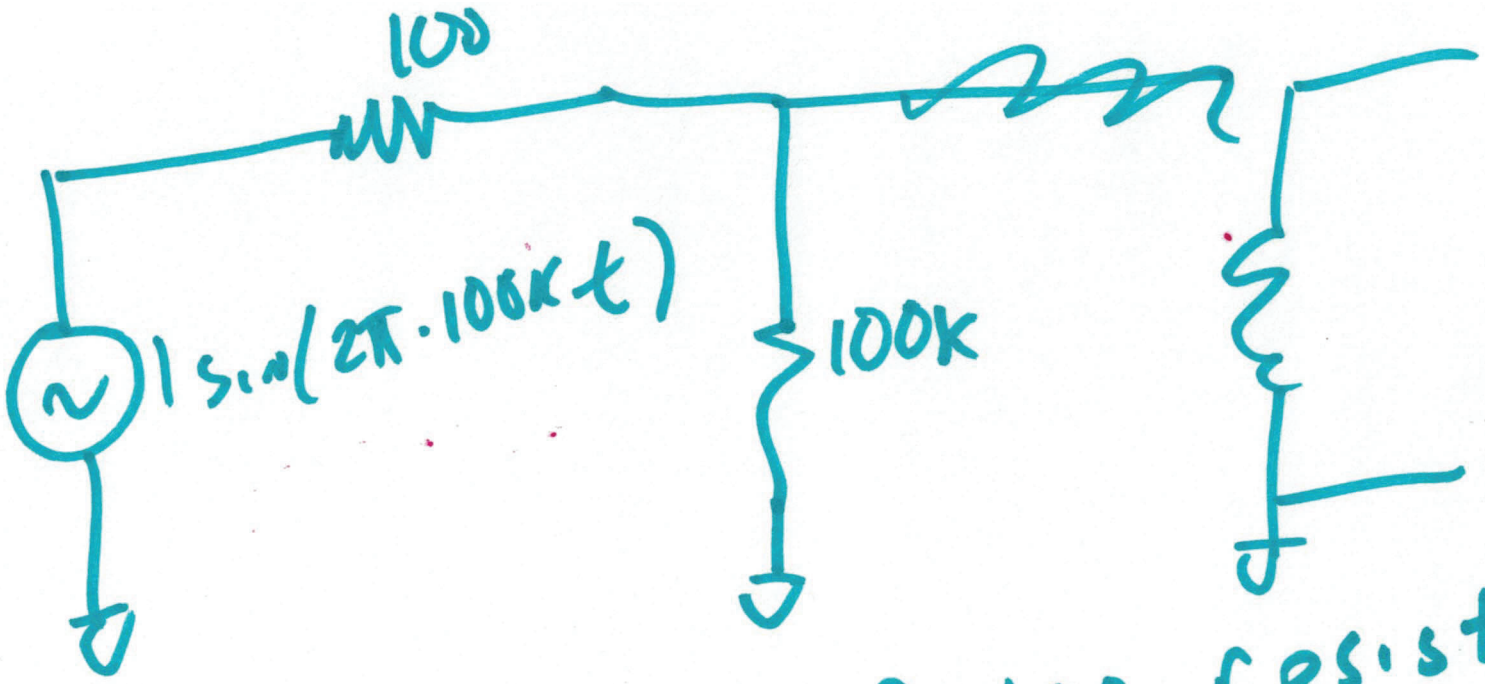
$$\frac{1}{9}$$



don't use magnitizing current

$$I_2 = 8.47\,\text{mA} \cdot \sqrt{\frac{100\mu}{900\mu}} = 2.82\,\text{mA}$$

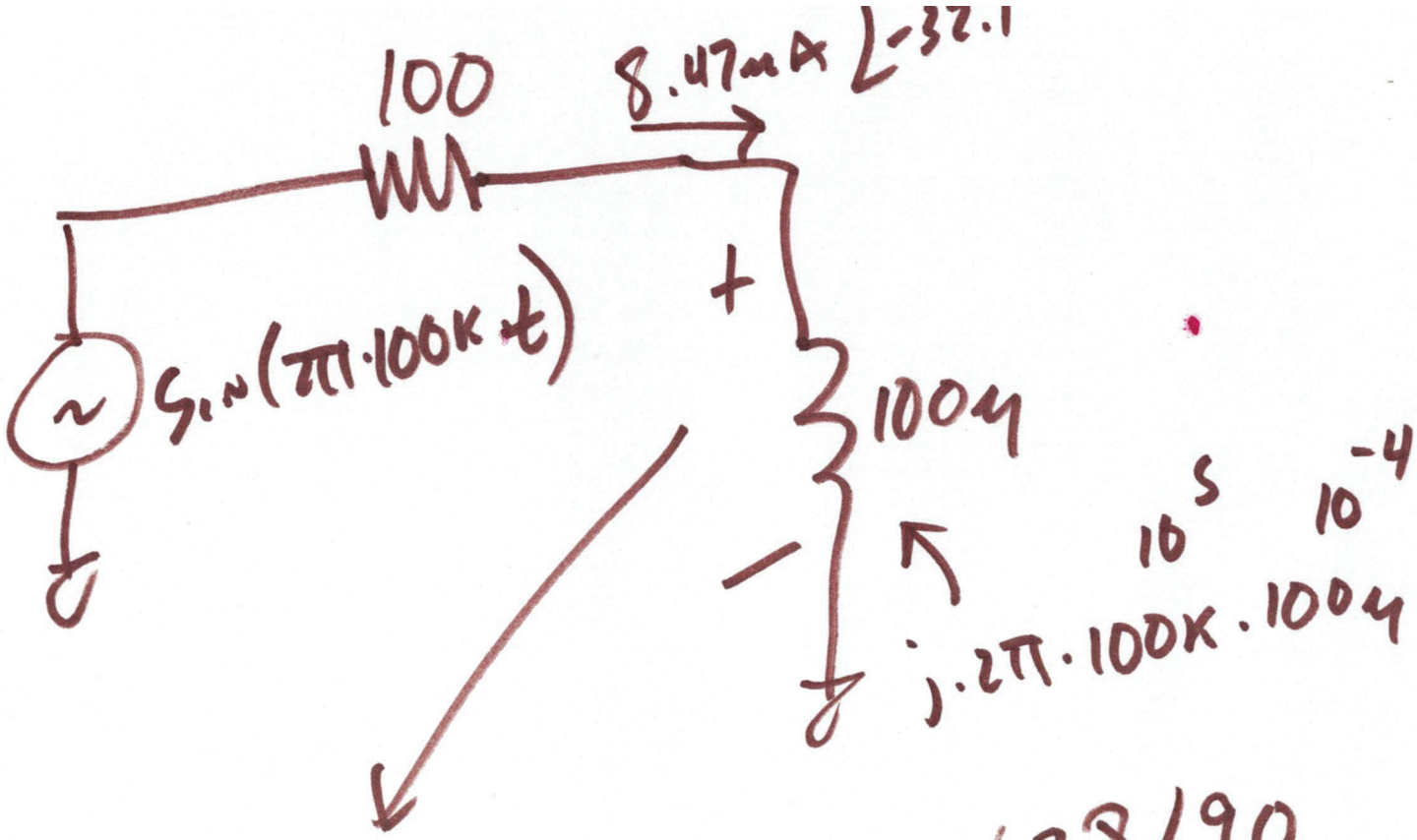
$$V_{OUT} = I_2 \cdot 100\text{k} = 282\,\text{V}$$



Average power resistor

$$P_{avg} = \frac{V_{rms}^2}{R} = I_{rms}^2 \cdot R$$

$$= \frac{\left(1.6/\sqrt{2}\right)^2}{100K} = \frac{1.6^2}{200K}$$



$$62.8\angle 90$$

$$V_1 = 8.47\text{mA}\angle -32.1 \cdot 62.8\angle 90$$

$$V_1 = .53\angle 58^\circ$$

$$V_1 = 530\text{mV} \cdot \sin(2\pi \cdot 100\text{K} \cdot t + 58^\circ)$$

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