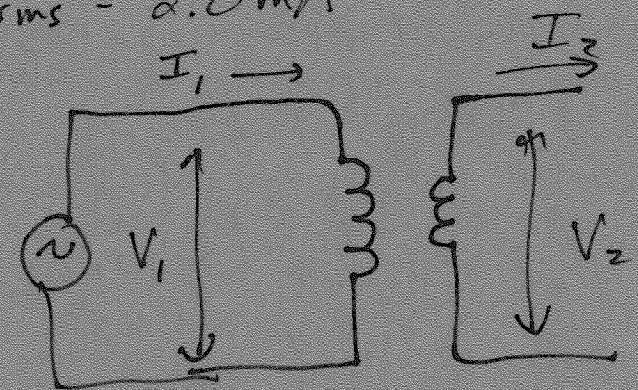


Ch. 15 Prob. 46

$$P_1 = P = 5.0 \text{ mW}$$

$$I_1 = I_{\text{rms}} = 2.0 \text{ mA}$$



$$V_2 = 20 \text{ V}_{\text{rms}}$$

a) Find the voltage across the primary.

$$P = I_{\text{rms}} \cdot V_{\text{rms}} \rightarrow V_{\text{rms}} = \frac{P}{I_{\text{rms}}} = \frac{5.0 \text{ mW}}{2.0 \text{ mA}}$$

$$V_{\text{rms}} = 2.5 \text{ V}_{\text{rms}}$$

b) Find the ratio of secondary to primary turns in the transformer.

$$V_s = \frac{N_s}{N_p} \cdot V_p \rightarrow \frac{V_s}{V_p} = \frac{N_s}{N_p}$$

$$\text{so } \frac{N_s}{N_p} = \frac{V_s}{V_p} = \frac{20 \text{ V}_{\text{rms}}}{2.5 \text{ V}_{\text{rms}}} = 8$$

This is a step-up transformer and there are 8x more turns in the secondary than the primary.