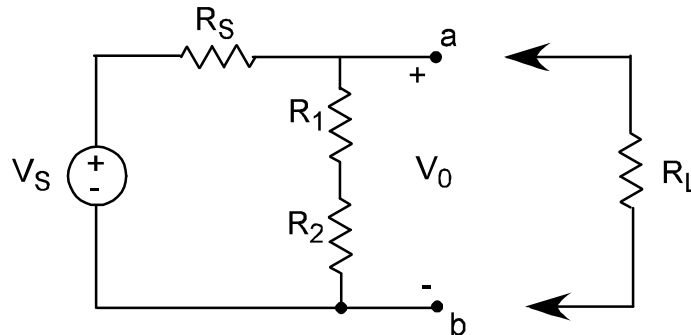


Homework Set #4
DUE Friday, March 17, 2017

1. For the following circuit:



$R_L = 12 \text{ k}\Omega$, $R_1 = 4 \text{ k}\Omega$, and $R_2 = 2 \text{ k}\Omega$ and $V_0 = 72 \text{ V}$ when the load resistor (R_L) **is not connected**. When the load resistor (R_L) **is connected** to terminals a-b, V_0 drops from 72 V to 60 V . Find the value of V_S and R_S .

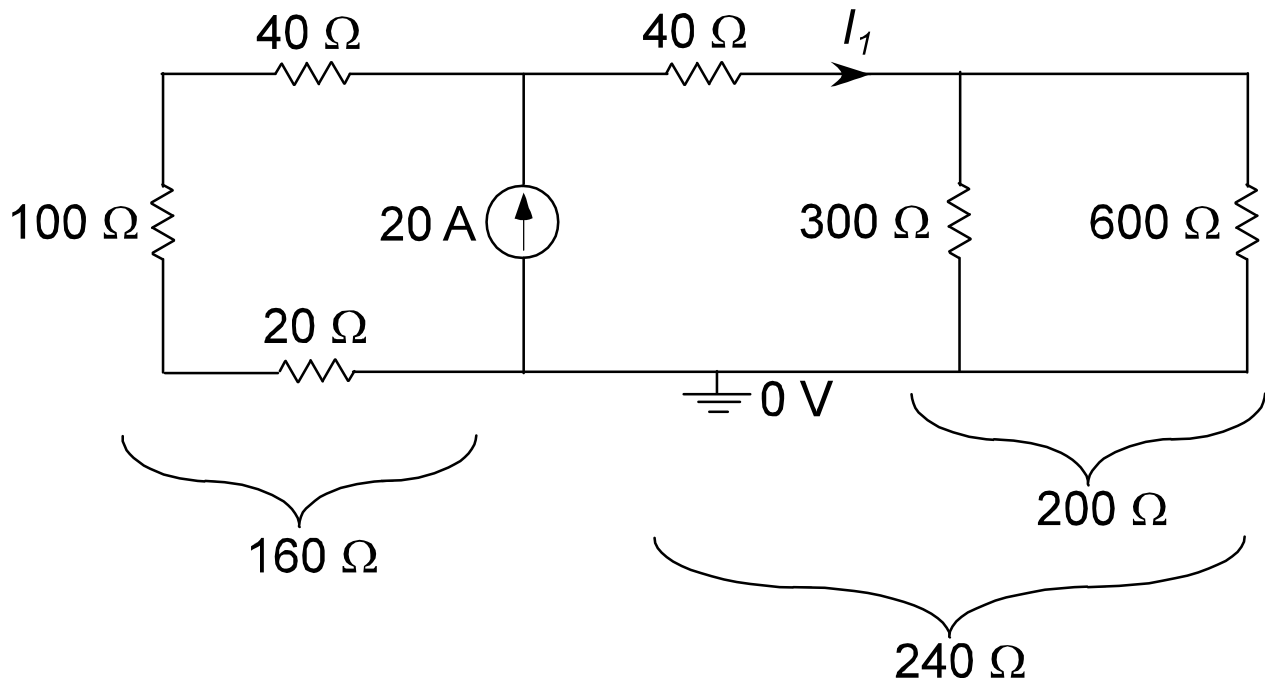
No-load:
$$V_0 = 72 = V_S \frac{4 + 2}{R_S + 6} \text{ ----- (1)}$$

Loaded:
$$V_0 = 60 = V_S \frac{6 // 12}{R_S + 6 // 12} \text{ ----- (2)}$$

Divide (1) by (2)
$$V_0 = 1.2 = 1.5 \frac{R_S + 4}{R_S + 6} \text{ gives: } 1.2R_S + 7.2 = 1.5R_S + 6$$

So:
$$1.2 = 0.3R_S \quad \therefore R_S = 4 \text{ k}\Omega \text{ and } V_S = 120 \text{ V}$$

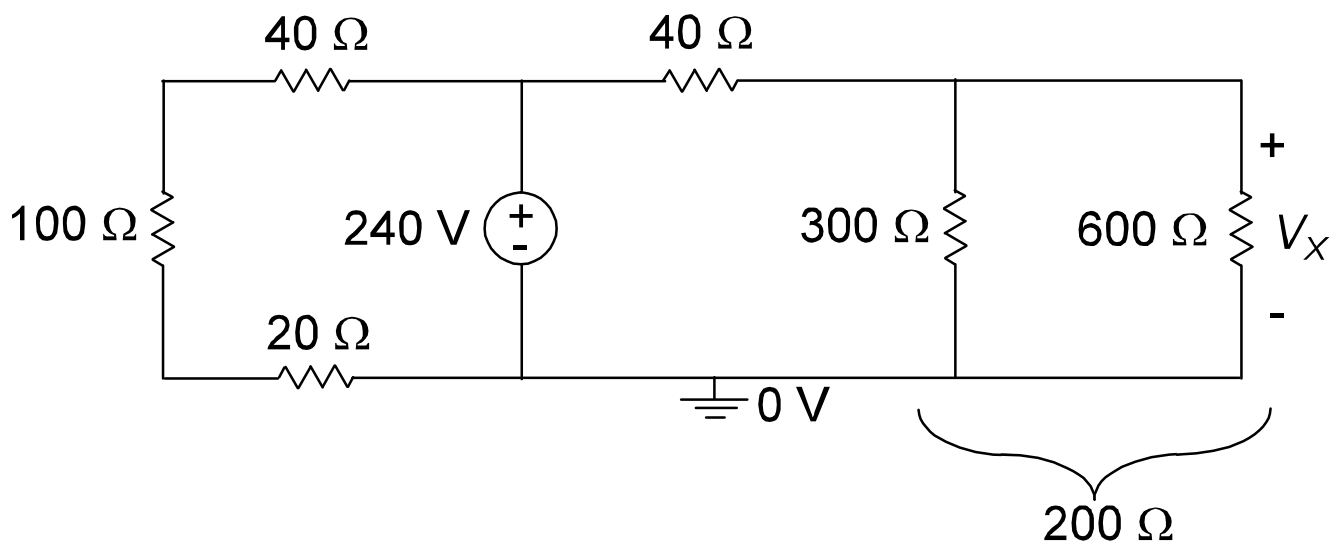
2. Given the following circuit, find the value of I_1 using current divider.



$$\therefore R_{eq} = 160 // 240 = 96 \Omega$$

$$I_1 = 20 \times \frac{96}{240} = 8 \text{ A}$$

3. Suppose the current source has been changed into a 240 V voltage source, find V_x using voltage divider.



$$V_x = 240 \times \frac{200}{240} = 200 \text{ V}$$