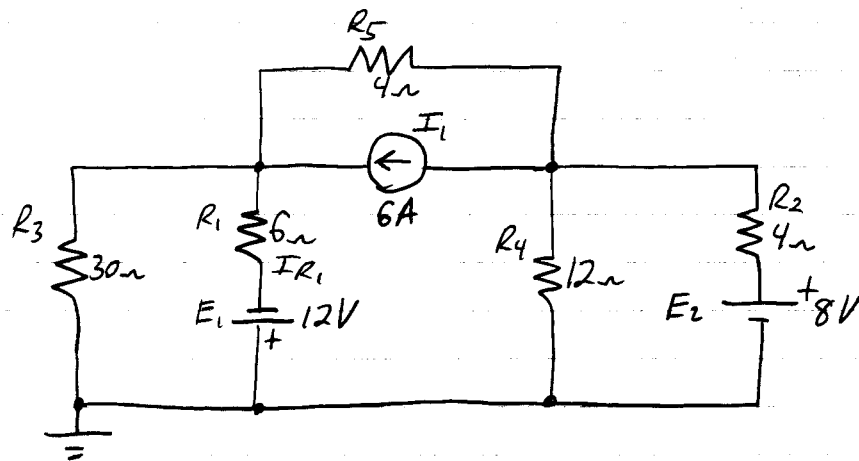
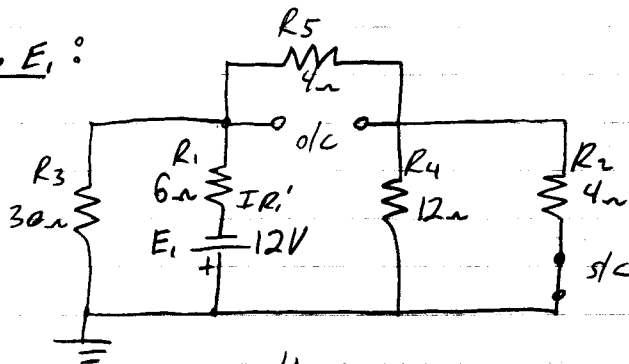


(EXAMPLE) Find I_{R_1} + P_{R_1}

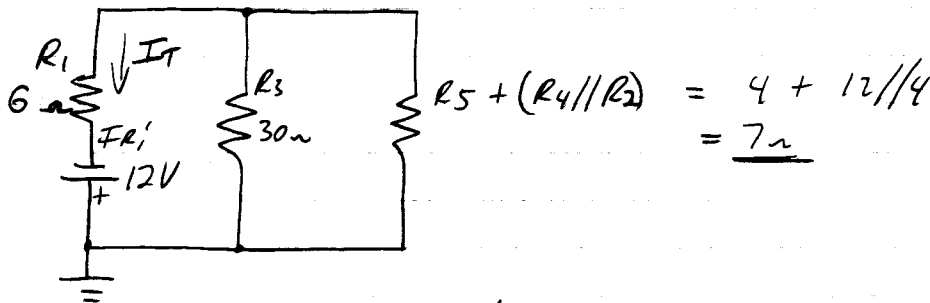


3 SOURCES °°
3 CIRCUITS TO
ANALYZE

DUE TO E_1 :



✓✓ REDRAW, COMBINE $R_4 // R_2 + R_5$



$$R_T = R_1 + R_3 // 7$$

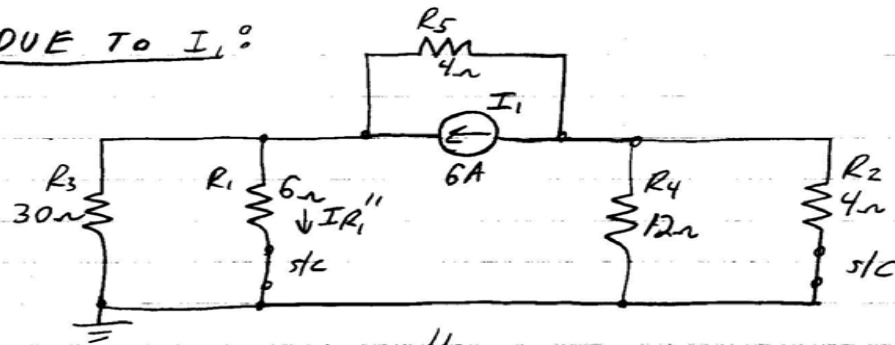
$$= 6 + 30 // 7$$

$$= \underline{11.67 \Omega}$$

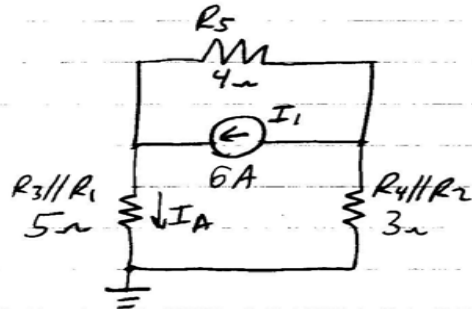
$$\therefore I_T = \frac{12V}{11.67 \Omega} = \underline{1.028 A}$$

$$\therefore \underline{I_{R_1} = 1.028 A}$$

DUE TO I_1 :



REDRAW



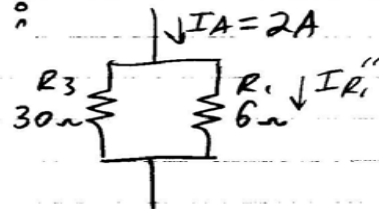
$$I_A = I_T(R_T/R_X)$$

$$I_A = 6A[(8\Omega//4\Omega)/8\Omega]$$

$$I_A = 2A$$

$$I_A = I_1 \left(\frac{R_5}{R_5 + 5 + 3} \right) = 6A \left(\frac{4}{4 + 5 + 3} \right) = 2A$$

∴ WE HAVE :



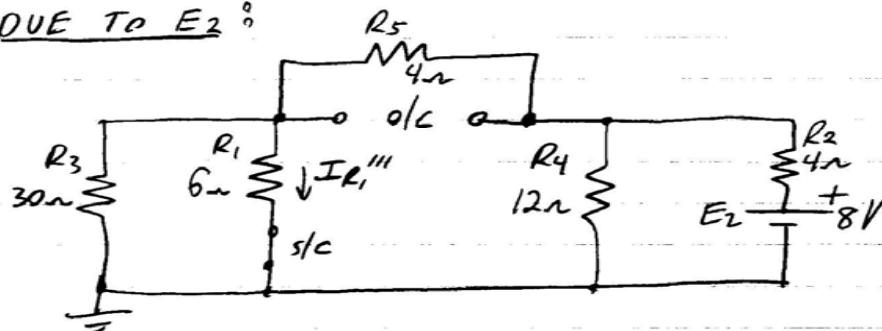
$$I_{R_1} = I_A \left(\frac{R_3}{R_3 + R_1} \right) = 2A \left(\frac{30}{36} \right)$$

$$I_{R_1}'' = I_T(R_T/R_X)$$

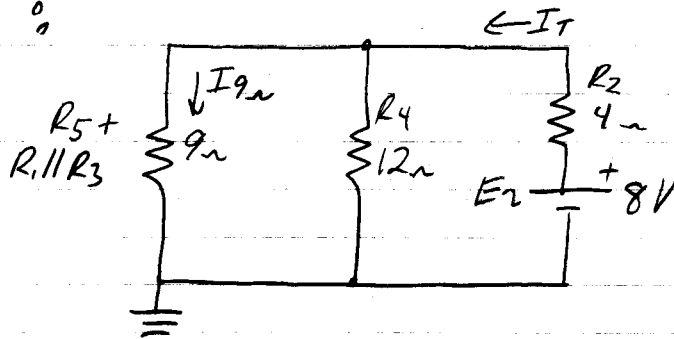
$$I_{R_1}'' = I_A[(6\Omega//30\Omega)/6\Omega]$$

$$I_{R_1}'' = 1.67A$$

DUE TO E_2 :



REDRAW :

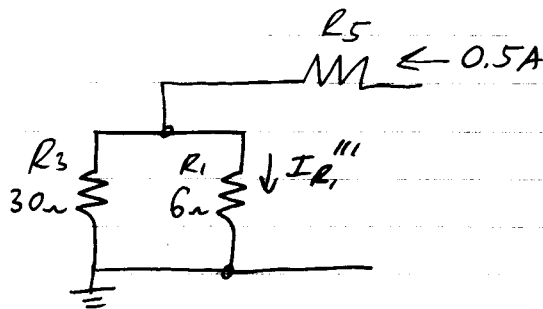


$$I_T = \frac{E_2}{R_T}, \quad R_T = 9\Omega // 12\Omega + 4\Omega = \underline{9.143\Omega}$$

$$\therefore I_T = \frac{8V}{9.143\Omega} = \underline{875mA}$$

$$I_{9\Omega} = I_T \left(\frac{12}{12+9} \right) = 875mA \left(\frac{12}{21} \right) = \underline{0.5A}$$

\therefore WE HAVE :



$$I_{R_1}''' = 0.5A \left(\frac{R_3}{R_1 + R_3} \right) = 0.5A \left(\frac{30}{36} \right) = \underline{416.67mA}$$

$$I_{R_1} = I_{R_1}' + I_{R_1}'' + I_{R_1}''' = 1.028A + 1.667A + 416.67mA$$

$$\boxed{I_{R_1} = 3.11A}$$

$$P_{R_1} = (I_{R_1})^2 R_1 = (3.11A)^2 (6\Omega) = \boxed{58.03W}$$