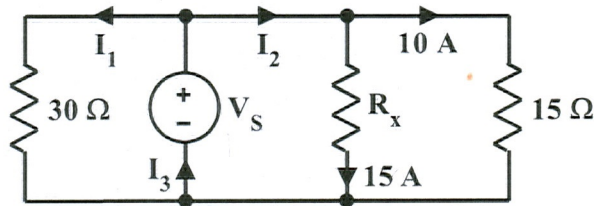


EE/EET 2240
Homework Problem #06

For the circuit shown below:



a. Determine the value of V_S .

$$V_S = (15 \Omega)(10 A) = 150 V$$

b. Determine the value of I_1 .

$$I_1 = \frac{V_S}{30 \Omega} = \frac{150 V}{30 \Omega} = 5 A$$

c. Determine the value of I_2 .

$$I_2 = 10 A + 15 A = 25 A$$

d. Determine the value of I_3 .

$$I_3 = I_1 + I_2 = 5 A + 25 A = 30 A$$

e. Determine the value of R_x .

$$R_x = \frac{V_S}{15 A} = \frac{150 V}{15 A} = 10 \Omega$$

f. How much power does the 15Ω resistor absorb?

$$P_{15 \Omega} = (10 A)^2 (15 \Omega) = 1.5 \text{ kW}$$

g. How much power does the 30Ω resistor absorb?

$$P_{30 \Omega} = \frac{V_S^2}{30 \Omega} = \frac{(150 V)^2}{30 \Omega} = 750 W$$

h. How much power does R_x absorb?

$$P_x = V_S (15 A) = (150 V)(15 A) = 2.25 \text{ kW}$$

i. How much power does the independent voltage source deliver?

$$P_S = V_S I_3 = (150 V)(30 A) = 4.5 \text{ kW}$$

j. Verify that power is conserved.

$$P_{\text{absorbed}} = P_{30 \Omega} + P_x + P_{15 \Omega} = 750 W + 2.25 \text{ kW} + 1.5 \text{ kW} \\ = 4.5 \text{ kW}$$

$$P_{\text{delivered}} = P_S = 4.5 \text{ kW}$$

$$P_{\text{absorbed}} = P_{\text{delivered}} \Rightarrow \text{power is conserved}$$