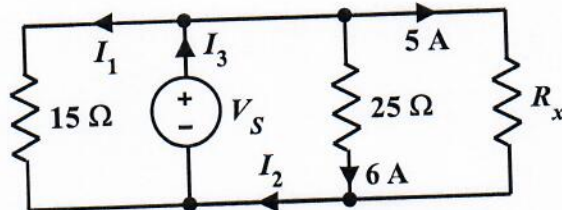


EE/EET 2240
Homework Problem #006

For the circuit shown below:



a. Determine the value of V_S .

$$V_S = (25\ \Omega)(6\ \text{A}) = 150\ \text{V}$$

b. Determine the value of I_1 .

$$I_1 = \frac{V_S}{15\ \Omega} = 10\ \text{A}$$

c. Determine the value of I_2 .

$$I_2 = 6\ \text{A} + 5\ \text{A} = 11\ \text{A}$$

d. Determine the value of I_3 .

$$I_3 = I_1 + I_2 = 10\ \text{A} + 11\ \text{A} = 21\ \text{A}$$

e. Determine the value of R_x .

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

f. How much power does the $15\ \Omega$ resistor absorb?

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

g. How much power does the $25\ \Omega$ resistor absorb?

$$(25\ \Omega)(6\ \text{A})^2 = 900\ \text{W}$$

h. How much power does R_x absorb?

$$R_x (5\ \text{A})^2 = 750\ \text{W}$$

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

$$V_S I_3 = (150\ \text{V})(21\ \text{A}) = 3150\ \text{W}$$

j. Verify that power is conserved.

$$\text{Total power absorbed} = 1.5\ \text{kW} + 900\ \text{W} + 750\ \text{W} = 3150\ \text{W}$$

$$\text{Total power delivered} = 3150\ \text{W}$$

$$\therefore \text{Total power absorbed} = \text{Total power delivered}$$

$$\Rightarrow \text{power is conserved}$$