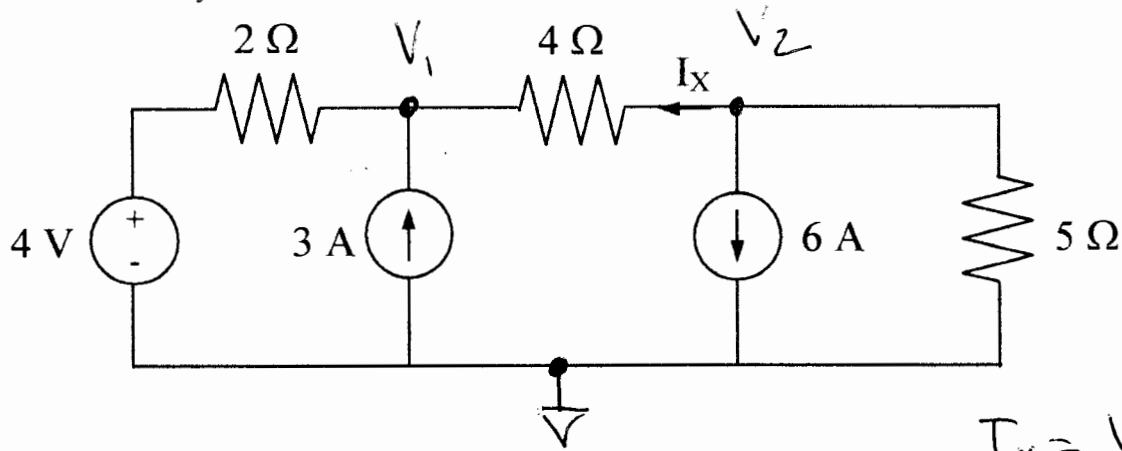


Consider the following circuit. Label the circuit with node voltage variables and a reference node. Write the nodal equations and solve for the node voltage variables. Find the current I_X and find the power delivered by each source and absorbed by each resistor.



$$I_X = \frac{V_2 - V_1}{4}$$

$$(N1) \frac{V_1 - 4}{2} + \frac{V_1 - V_2}{4} + (-3) = 0$$

$$(N2) \frac{V_2 - V_1}{4} + 6 + \frac{V_2}{5} = 0$$

$$V_1(0.75) + V_2(-0.25) = 5$$

$$V_1(-0.25) + V_2(0.45) = -6$$

$$V_1 = 2.73 \text{ V}$$

$$V_2 = -11.82 \text{ V}$$

$$I_X = -3.64 \text{ A}$$

$$3\text{A}: P = V_1(3) = 8.19 \text{ W, Del}$$

$$4\text{V}: P = 4\left(\frac{V_1 - 4}{2}\right) = -2.54 \text{ W, Abs}$$

or 2.54 W, Del

$$6\text{A}: P = -V_2(6) = 70.91 \text{ W, Del}$$

$$2\Omega: P = \frac{(V_1 - 4)^2}{2} = 0.81 \text{ W, Abs}$$

$$4\Omega: P = \frac{(V_1 - V_2)^2}{4} = 52.91 \text{ W, Abs}$$

$$5\Omega: P = \frac{V_2^2}{5} = 27.93 \text{ W, Abs}$$

4V	3A	6A	2 ohm	4 ohm	5 ohm
2.54W	8.19W	70.91W	0.81W	52.91W	27.93W
Del	Del	Del	Abs	Abs	Abs