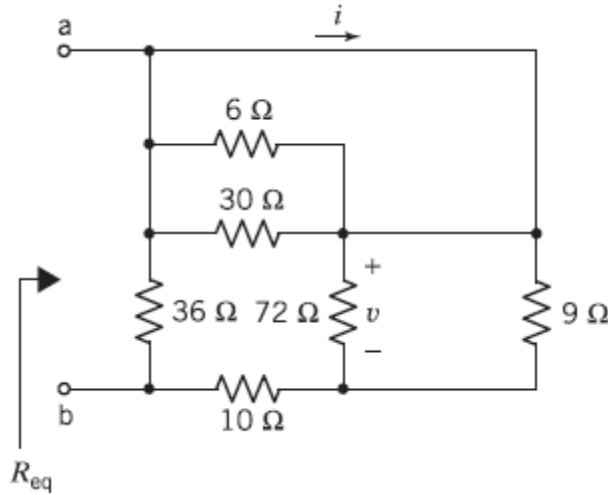


Name:

Student ID #:

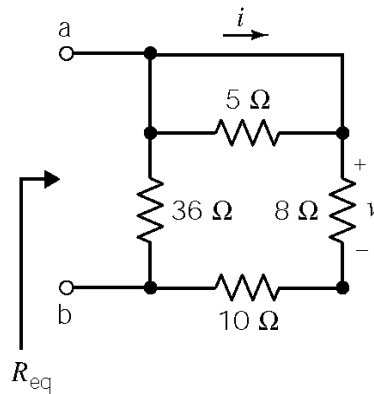
1. (20pts) (Equivalent Resistance and Voltage division) Determine the values of  $i$ ,  $v$ , and  $R_{eq}$  by the circuit model shown in Figure, given that  $v_{ab} = 36 \text{ V}$ .



**Solution:**

Replace parallel resistors by equivalent resistors:

$$6 \parallel 30 = 5 \Omega \text{ and } 72 \parallel 9 = 8 \Omega$$



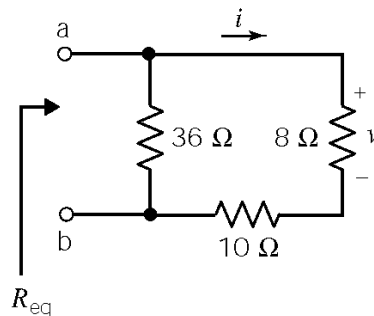
A short circuit in parallel with a resistor is equivalent to a short circuit.

$$R_{eq} = 36 \parallel (8 + 10) = 12 \Omega$$

Using voltage division when  $v_{ab} = 36 \text{ V}$ :

$$v = \frac{8}{8+10} v_{ab} = \frac{4}{9}(36) = 16 \text{ V}$$

$$i = \frac{v}{8} = 2 \text{ A}$$



2. (10 pts) (KCL, KVL and Power) Determine the power received by the 6 Ω resistor in the circuit shown in Figure.

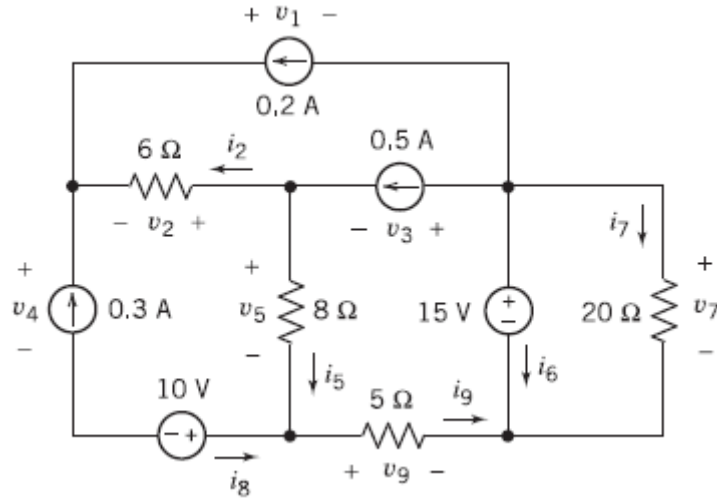


Figure P 3.2-11

**Solution**

The subscripts suggest a numbering of the circuit elements. Apply KCL to get

$$i_2 + 0.2 + 0.3 = 0 \Rightarrow i_2 = -0.5 \text{ A}$$

The power received by the 6 Ω resistor is

$$p_2 = 6i_2^2 = 6(-0.5)^2 = 1.5 \text{ W}$$