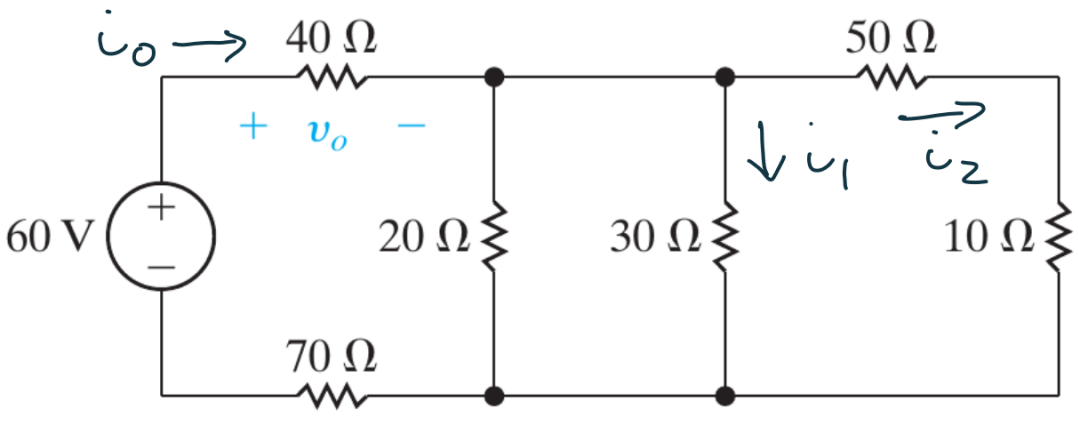
Assessment Problem 3.4

a) Use voltage division to determine the voltage v_o across the 40 Ω resistor in the circuit shown.
b) Use v_o from part (a) to determine the current through the 40 Ω resistor, and use this current and current division to calculate the current in the 30 Ω resistor.
c) How much power is absorbed by the 50 Ω resistor?



(a) $R_{eq} = 40 + 20 \| 30 \| (50+10) + 70$

$= 110 + \dfrac{1}{\frac{1}{20} + \frac{1}{30} + \frac{1}{60}}$

$= 120\ \Omega$

$\therefore v_o = \dfrac{40}{120} \times 60 = 20\ V$

(b) $i_o = \dfrac{v_o}{40} = 0{,}5\ A$

$R_{eq} = 20 \| 30 \| (50+10) = 10\ \Omega$

$\therefore i_1 = \dfrac{10}{30} \times 0{,}5 = 166{,}67\ mA$

(c) $i_2 = \frac{10}{60} \times 0,5 = 83,3 \text{ mA}$

$P_{50\Omega} = i_2^2 \times 50 = 347,22 \text{ mW}$