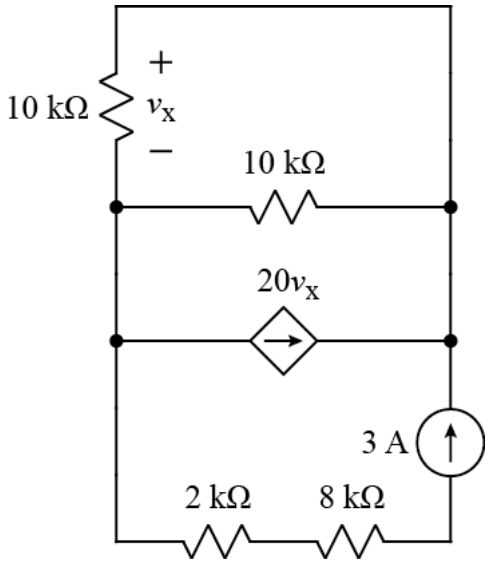
HOMEWORK #8 prob 5 solution

EX:



Calculate the power dissipated by the dependent current source, (labeled $20v_x$).

SOL'N:

Using node-voltage:

$$+3 + 20V_x + \frac{V_1}{10k} + \frac{V_1}{10k} = 0$$

$$V_1 = V_x$$

$$\therefore V_1\left(20 + \frac{1}{10k} + \frac{1}{10k}\right) = -3$$

$$V_1 = \frac{-3\,(10k)}{20(10k)+2} \cong -150\,mV$$

$$\text{power} = (20V_x)V_x = 20\,(450m)^2 = \boxed{450\,mW}$$

positive means absorbing power