Chapter 5, Solution 30.

In the circuit shown in Fig. 5.68, find i_x and the power absorbed by the 20-kΩ resistor.

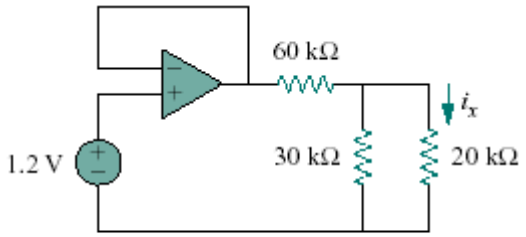

Figure 5.68
For Prob. 5.30.

Solution

The output of the voltage becomes

$$v_o = v_i = 1.2 \text{ V}$$
$$(30\text{k} \| 20\text{k}) = 12\text{k}\Omega$$

By voltage division,

$$v_x = \frac{12}{12+60}(1.2) = 0.2\text{V}$$

$$i_x = \frac{v_x}{20\text{k}} = \frac{0.2}{20\text{k}} = \frac{20}{2\text{x}10^6} = \mathbf{10\mu A}$$

$$p = \frac{v_x^2}{R} = \frac{0.04}{20\text{k}} = \mathbf{2\mu W}.$$