MASSACHVSETTS INSTITVTE OF TECHNOLOGY
Department of Electrical Engineering and Computer Science
6.01—Introduction to EECS I
Fall Semester, 2007

Quiz 8
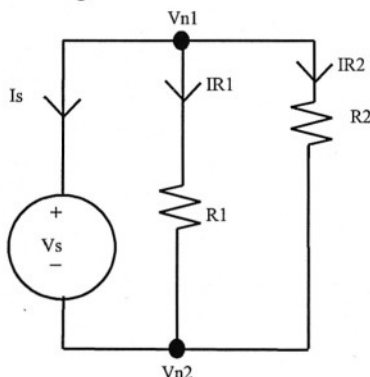
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Question 1: For the circuit below, suppose you know the current $i_s = -0.5$ amps, $V_S = 5$ volts and that $R_1 = 2 * R_2$. Please determine numerical values for R_1 and R_2. Try to use simplifications, you will find it too time-consuming otherwise.

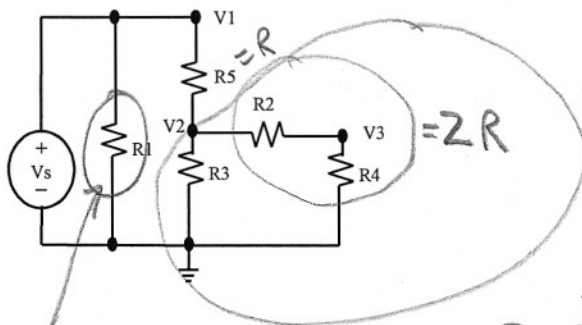$$R_1 = 30$$
$$R_2 = 15$$

$$I_s = -0.5 = i_{R_1} + i_{R_2}$$

$$R_1 \| R_2 = 2R_2 \| R_2$$
$$= \frac{2}{3} R_2$$

$$\frac{V_s}{\frac{2}{3}R_2} = 0.5 \Rightarrow \frac{5}{\frac{1}{3}} = R_2$$
$$R_2 = 15$$

Question 2: In the circuit below, suppose $V_S = 5$ volts and all the resistors are equal, that is, $R_1 = R_2 = R_3 = R_4 = R_5$. Please determine the numerical value for V_2 with respect to the ground. Hint: Note that there are series-parallel combinations that you can use to simplify the problem.

$$2R \| R = \frac{2}{3} R$$

Does Not affect V_2

$$V_2 = 5 \cdot \frac{\frac{2}{3}R}{\frac{2}{3}R + R} = 5 \frac{\frac{2}{3}}{\frac{2}{3}+1} = 2$$

Voltage Divider