Aula 7 - Exercise Class 2

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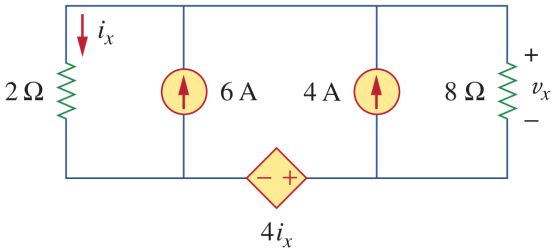
Fundamentals of Electric Circuits (Alexander and Sadiku), 4th Edition

Superposition

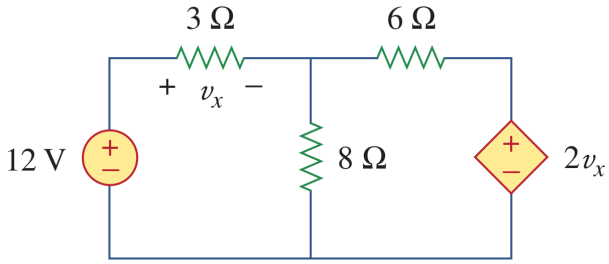
Problem 4.19 - Use superposition to solve for v_x in the circuit of Figure below.



Answer: $v_x = -26.67V$.

Source Transformation

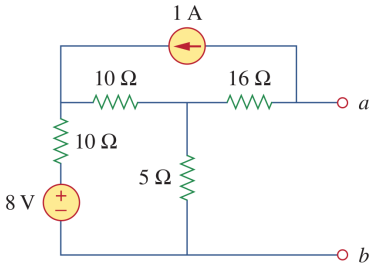
Problem 4.31 - Determine v_x in the circuit of Figure below using source transformation.



Answer: $v_x = 3.652V$.

Thevenin's Theorem

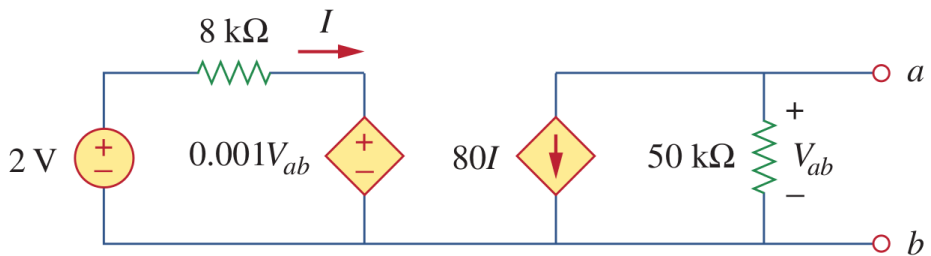
Problem 4.39 - Obtain the Thevenin equivalent at terminals $a - b$ of the circuit in Figure below.



Answer: $v_t = -16.4V \; and \; R_t = 20\Omega$

Norton's Theorem

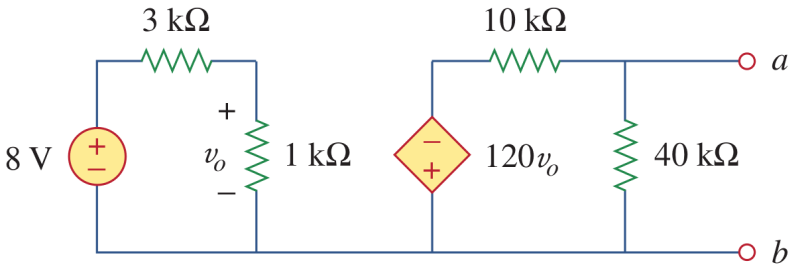
Problem 4.55 - Obtain the Norton equivalent at terminals $a - b$ of the circuit in Figure below.



Answer: $i_n = -20mA \; and \; R_n = 100K\Omega$

Maximum Power Transfer

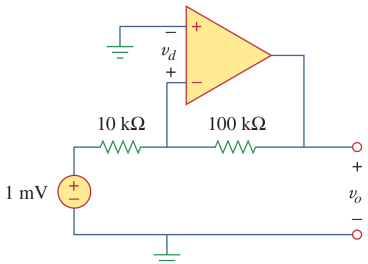
Problem 4.71 - For the circuit in Figure below, what resistor connected across terminals $a - b$ will absorb maximum power from the circuit? What is that power?

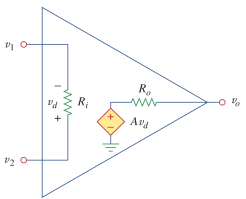


Answer: $R_L = 8K\Omega \; and \; P_L = 1.152W$

Operational Amplifiers

Problem 5.7 - The op amp in Figure below has $R_i = 100K\Omega$, $R_o = 100\Omega$, $A = 100,000$. Find the differential voltage v_d and the output voltage v_o.

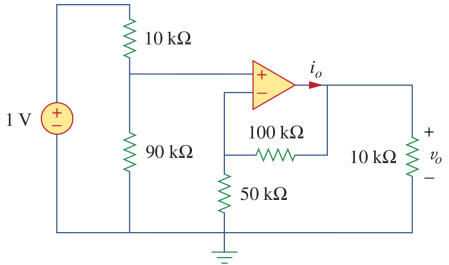




Answer: $v_d = -100nV$ *and* $v_o = -10mV$

Ideal Op Amp

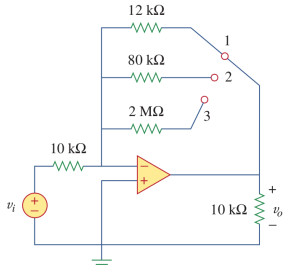
Problem 5.13 - Find v_o and i_o in the circuit of Figure below.



Answer: $v_o = 2.7V \; and \; i_0 = 288\mu V$

Ideal Op Amp

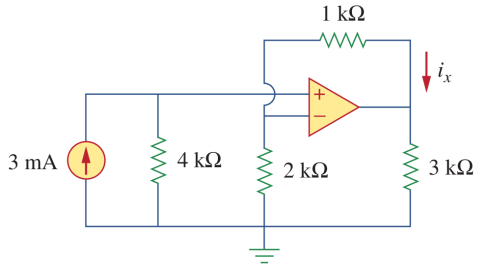
Problem 5.17 - Calculate the gain v_o/v_i when the switch in Figure below is in: (a) position 1, (b) position 2 and (c) position 3.



Answer: $(a)\ \frac{v_o}{v_i} = -1.2, (b)\ \frac{v_o}{v_i} = -8,\ and\ (a)\ \frac{v_o}{v_i} = -200$

Inverting, Noninverting, Summing and Difference Amplifiers

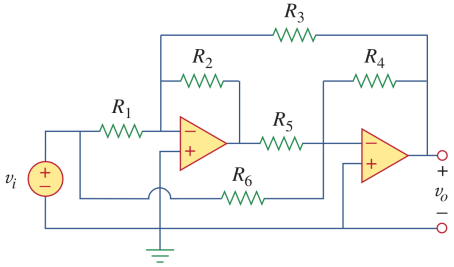
Problem 5.33 - Refer to the op amp circuit in Figure below. Calculate i_x and the power dissipated by the $3K\Omega$ resistor.



Answer: $i_x = -6mA \; and \; p_{3k} = 108mW$

Cascaded Op Amp Circuits

Problem 5.63 - Determine the gain v_o/v_i of the circuit in Figure below.



Answer: $\frac{v_o}{v_i} = \frac{\frac{R_2R_4}{R_1R_5} - \frac{R_4}{R_6}}{1 - \frac{R_2R_4}{R_3R_5}}$