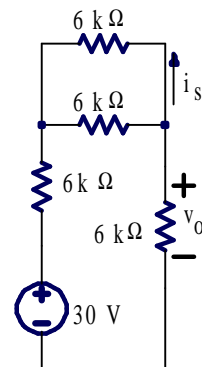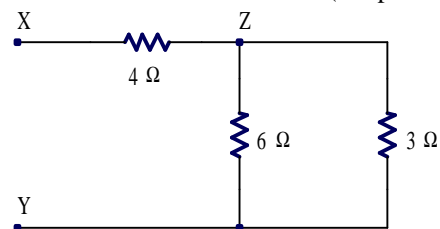21.) Combine some resistors in series and/or parallel to find a single-loop circuit that is equivalent to the given circuit below with respect to finding v_o. Use the knowledge of v_o to find the currents through some of the resistors in the given circuit and ultimately, find i_s.   (4/4 points)
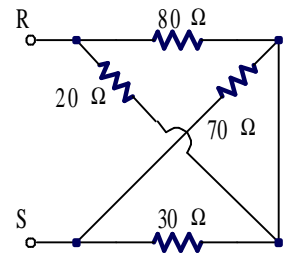

22.) An ohmmeter is an instrument for measuring electrical resistance directly in ohms. It has two probes. When each probe is attached to a different node in a circuit containing only resistors, the ohmmeter reads the resistance found between the two probes. In the circuit shown below what will an ohmmeter read if it is connected. . .   (4/4 points)

a.) . . .to nodes X and Y and

b) . . .to nodes Z and Y?

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23.) What will an ohmmeter read if it is connected to nodes R and S?

24.) Write KVL equations for each circuit shown below. Use Ohm's law to express the KVL equations in terms of two unknowns, the loop current and v_8. Simplify the equations. By observing the simplified equations assign values to V and R in the circuit on the right below so that it is equivalent to the circuit on the left with respect to the voltage across and the current through the 8 Ω resistor. (The two simplified KVL equations should then be similar.) Then use the voltage divider equation to find v_8. Hint: This problem is easier if you label the loop current so that the passive sign convention is satisfied in both circuits for the 8 Ω resistor.