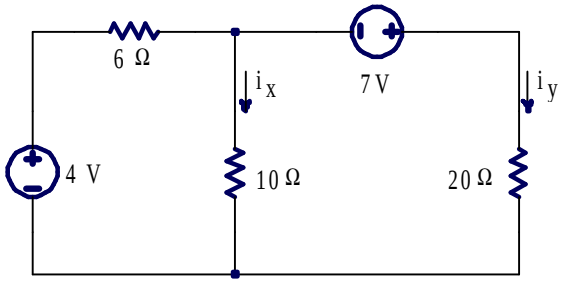
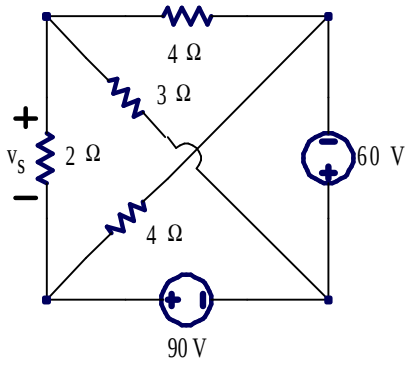
27.) Use mesh analysis to find i_x and i_y.



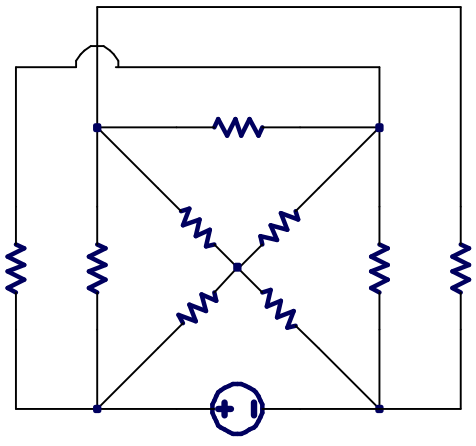
28.) In the circuit above (Problem 28), change the 10 Ω resistor so that i_y equals 0.41 A. What should the new resistance value be?

Hints: One of the resistance values is now unknown but one of the mesh currents is now known. Use mesh analysis to write two equations in two unknowns, one of those unknowns being the resistance. Then solve each mesh equation for a term of the form *iR*, where *i* is one of the mesh currents. Set those two equations equal and continue solving. One of the unknowns should drop out. Continue solving, eventually finding the resistance, *R*.

29.) In order to perform mesh analysis the circuit needs to be *planar*. That is, the circuit must be able to be drawn with no wires crossing. (A circuit is or is not planar regardless of how it is drawn, but a planar circuit *can be* drawn with no wires crossing.) Prove that the circuit shown below is planar by redrawing it with no wires crossing. Then find the voltage v_s

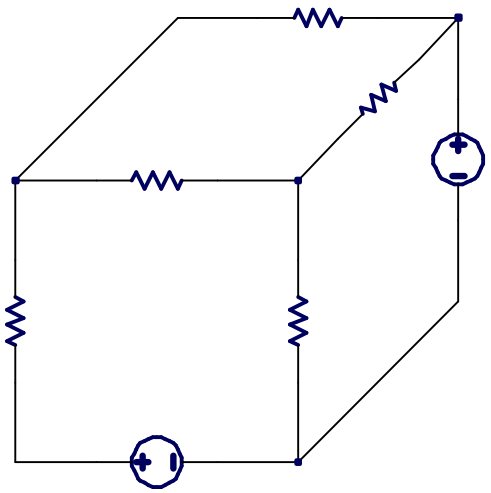


30.) For each of the circuits (a) through (d) shown below prove that it is planar or state that it is non-planar as the case may be. Use the definition of a *planar* circuit given in Problem 30 above.

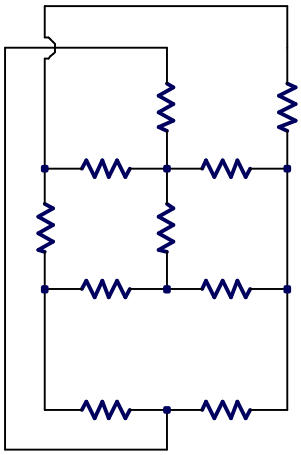


(a)

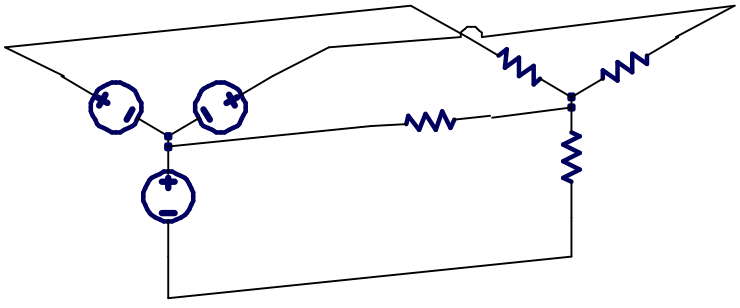
30.) (Continued) For each of the circuits (a) through (d) shown below prove that it is planar or state that it is non-planar as the case may be. Use the definition of a *planar* circuit given in Problem 30 above.



(b)



(c)



(d)