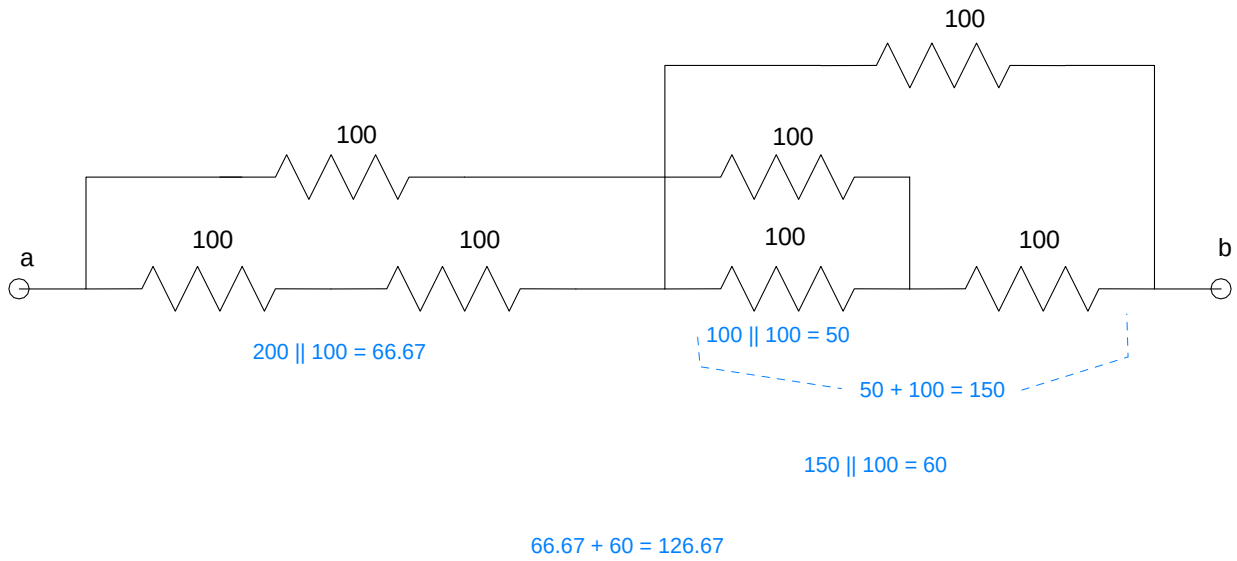
EE 206 Test #1c - Name _____

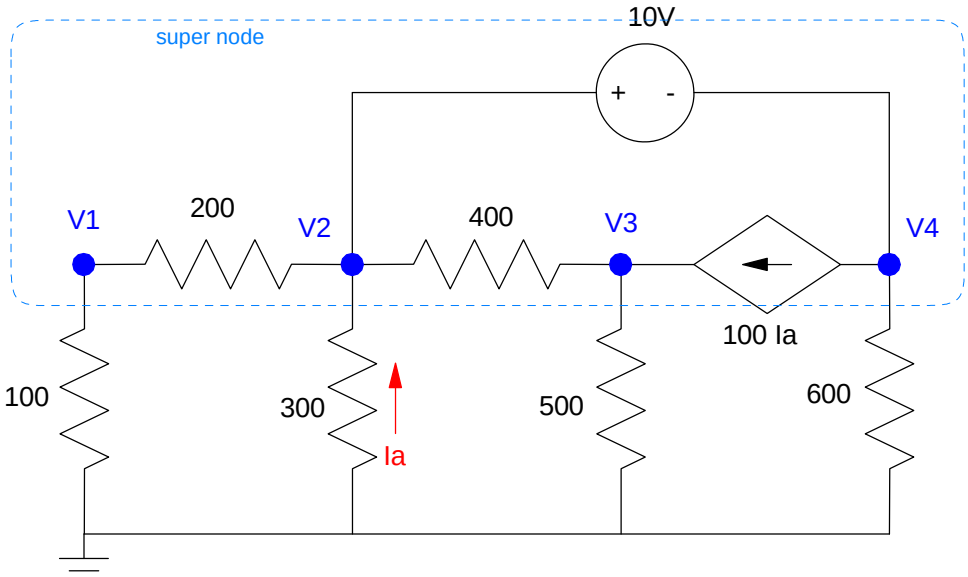
April 23-24, 2019

1a) Determine the resitance Rab

Rab = 126.67 Ohms



2) Write N equations to allow you to solve for the N unknown votlages



$$V_2 - V_4 = 10$$

$$I_a = \left(\frac{0 - V_2}{300}\right)$$

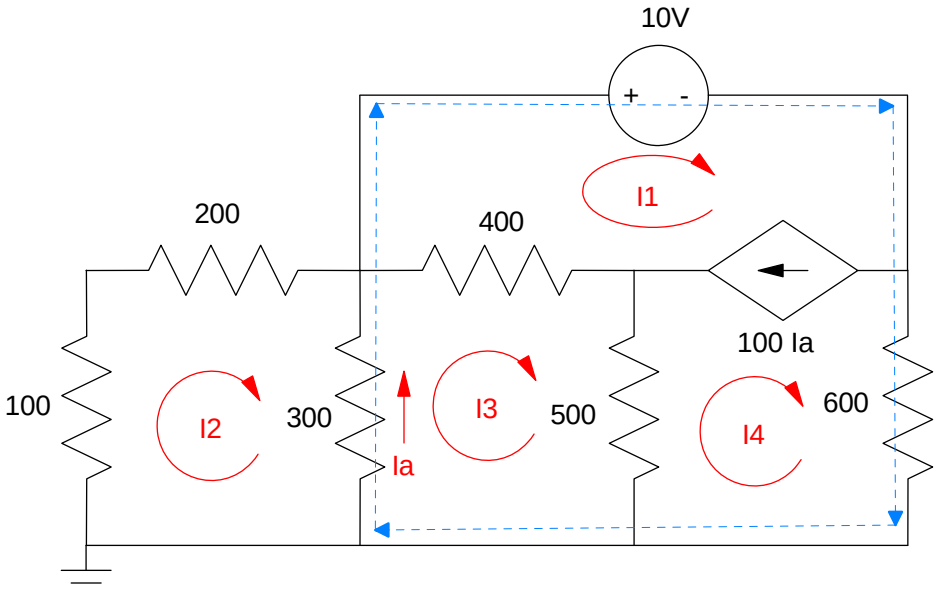
$$\left(\frac{V_1}{100}\right) + \left(\frac{V_1 - V_2}{200}\right) = 0$$

$$\left(\frac{V_3 - V_2}{400}\right) + \left(\frac{V_3}{500}\right) - 100I_a = 0$$

super-node

$$\left(\frac{V_1}{100}\right) + \left(\frac{V_2}{300}\right) + \left(\frac{V_3}{500}\right) + \left(\frac{V_4}{600}\right) = 0$$

3) Write N equations to allow you to solve for the N unknown currents



$$I_1 - I_4 = 100I_a$$

$$I_a = I_3 - I_2$$

$$100I_2 + 200I_2 + 300(I_2 - I_3) = 0$$

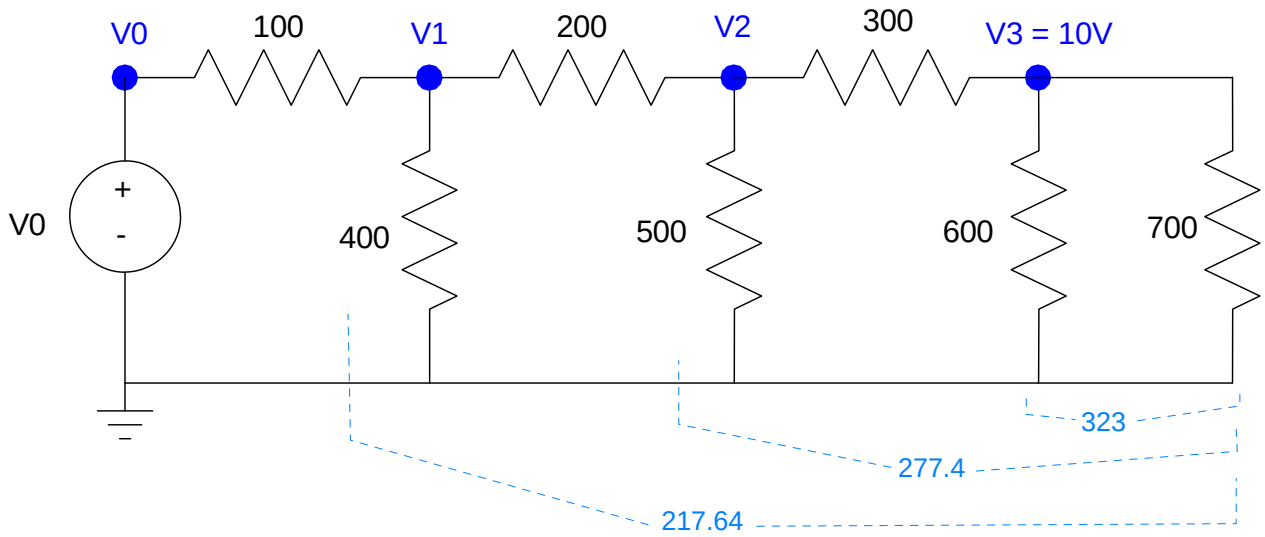
$$300(I_3 - I_2) + 400(I_3 - I_1) + 500(I_3 - I_4) = 0$$

super-loop

$$10 + 600I_4 + 300(I_3 - I_2) = 0$$

4) For the following circuit, the voltage at V3 is measured as 10V. Determine the voltages V0, V1, V2 (hint: use voltage division)

V0	V1	V2	V3
48.45	**33.20**	**19.29**	10.0V



$$V_3 = \left(\frac{323}{323+300}\right) V_2$$

$$V_2 = 19.29V$$

$$V_2 = \left(\frac{277.4}{277.4+200}\right) V_1$$

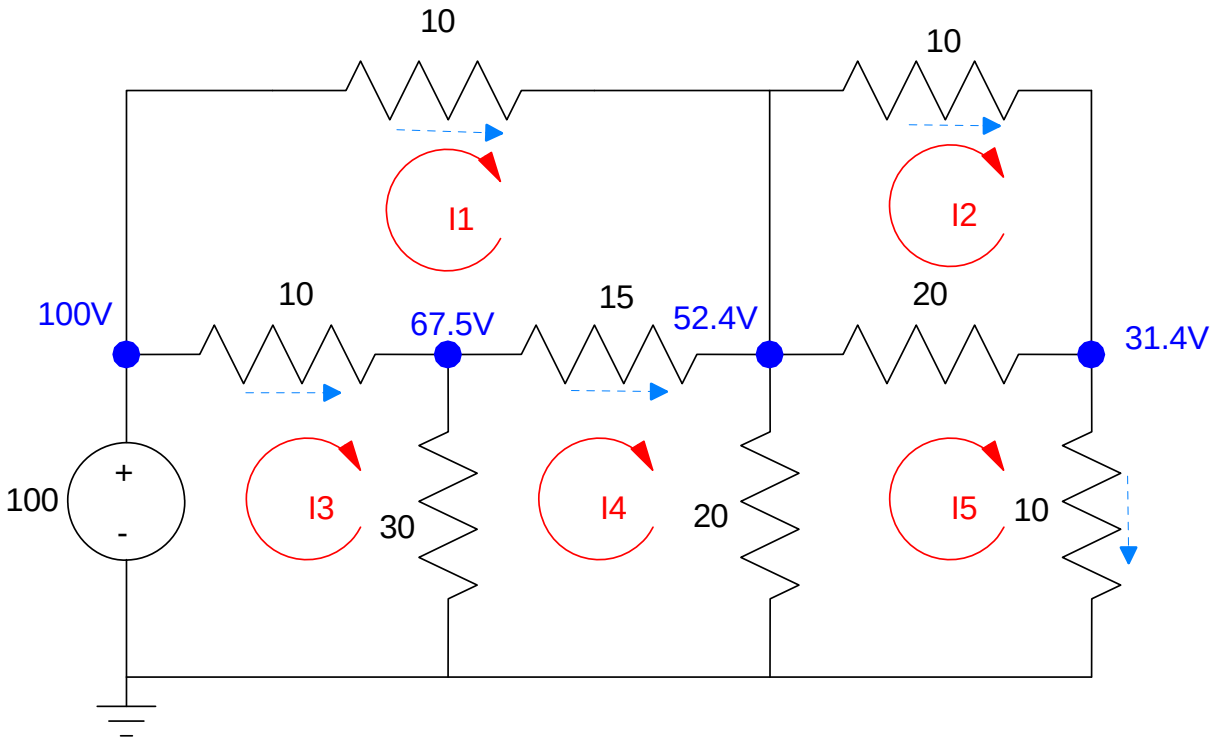
$$V_1 = 33.20V$$

$$V_1 = \left(\frac{217.64}{217.64+100}\right) V_0$$

$$V_0 = 48.45$$

5) Given the voltages, determine the loop currents

I1	I2	I3	I4	I5
4.76 A	**2.10 A**	**8.01 A**	**5.77 A**	**3.14 A**



$$I_1 = \left(\frac{100V - 52.4V}{10\Omega}\right) = 4.76A$$

$$I_2 = \left(\frac{52.4V - 31.4V}{10\Omega}\right) = 2.10A$$

$$I_5 = \left(\frac{31.4V}{10A}\right) = 3.14A$$

$$I_3 - I_1 = \left(\frac{100V - 67.5V}{10\Omega}\right)$$

$$I_3 = 8.01A$$

$$I_4 - I_1 = \left(\frac{67.5V - 52.4V}{15\Omega}\right)$$

$$I_4 = 5.77A$$