

Desk Copy

ECE 300
Spring Semester, 2006
HW Set #4:

Due: February 09, 2006
wlg

Name wlg
Print (last, first)

Use engineering paper. Work only on one side of the paper. Use this sheet as your cover sheet, placed on top of your work and stapled in the top left-hand corner. Number the problems at the top of the page, in the center of the sheet. **Do neat work. Underline your answers. Show how you got your equations. Be sure to show how you got your answers.** Each problem counts 10 points.

4.9 $V_o = 7 \text{ V}$

4.10 $V_{ab} = 6 \text{ V}$

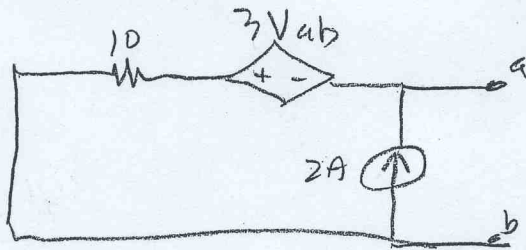
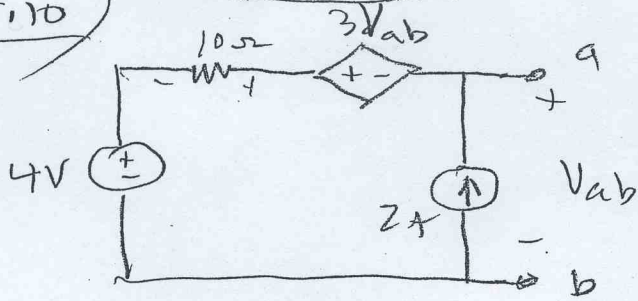
4.22 In addition, work by PSpice. Answer: $i = 0.555 \text{ A}$

4.27 $V_x = -48 \text{ V}$

4.32 In addition, work by Pspice. Answer: $i_x = 1.6 \text{ A}$

4.10

Superposition

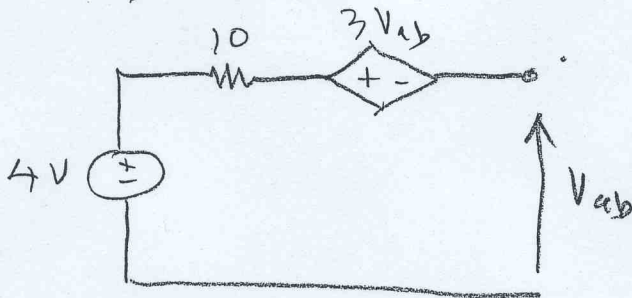


$$-V'_{ab} - 3V'_{ab} + 20 = 0$$

$$4V'_{ab} = 20$$

$$V'_{ab} = 5V$$

//



$$-V''_{ab} - 3V''_{ab} + 4 = 0$$

$$4V''_{ab} = 4$$

$$V''_{ab} = 1$$

$$V_{ab} = V'_{ab} + V''_{ab} = 5 + 1 = 6V$$

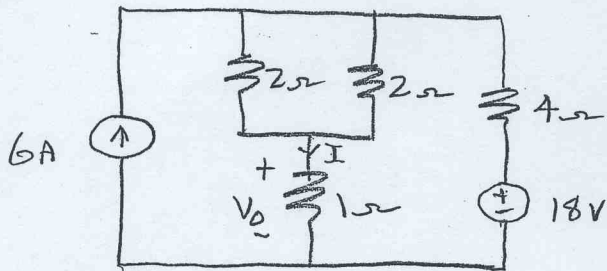
Ordinary Analysis

$$-V_{ab} - 3V_{ab} + 20 + 4 = 0$$

$$4V_{ab} = 24$$

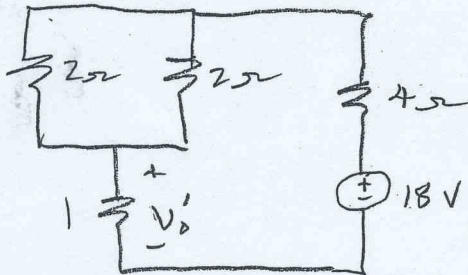
$$V_{ab} = 6V$$

A.9



$$I = I_1 + I_2, \quad V_D = 1 \times (I_1 + I_2)$$

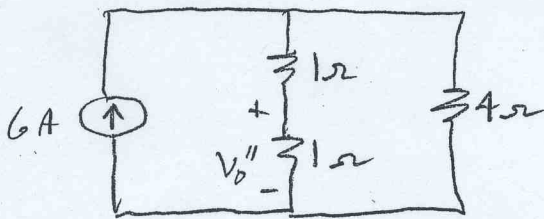
Suppress 6A source



voltage division

$$V'_D = \frac{(18) \times 1}{1 + 1 + 4} = 3V$$

Suppress 18V source



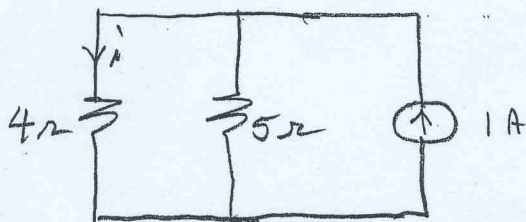
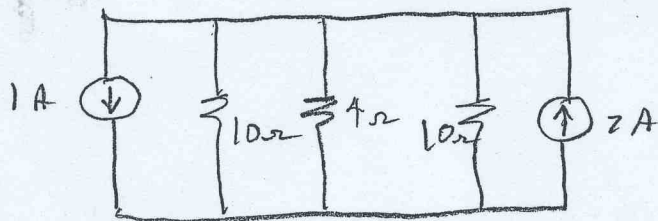
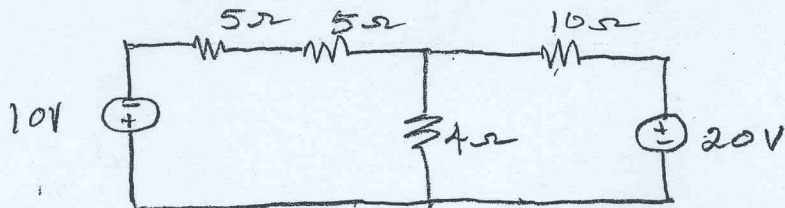
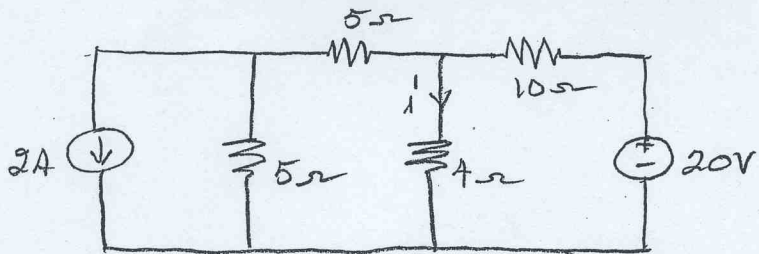
current
division

$$V''_D = \left(\frac{6 \times 4}{2 + 4} \right) \times 1 = 4V$$

$$V_D = V'_D + V''_D = 3V + 4V$$

$$V_D = 7V$$

4.22 Given the following circuit. Use source transformations to find i .

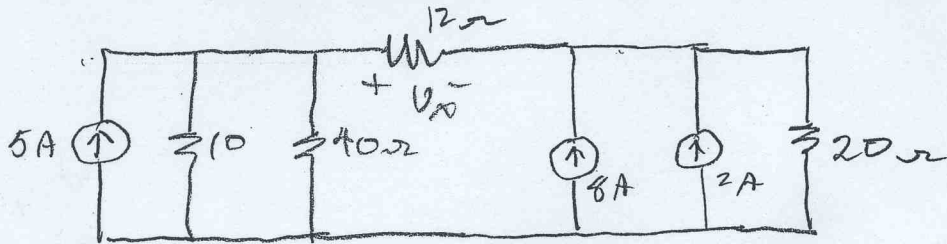
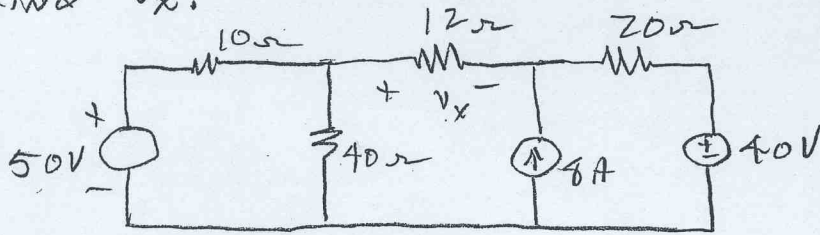


Current division

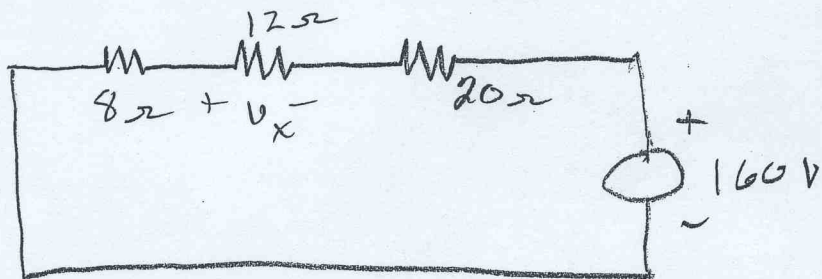
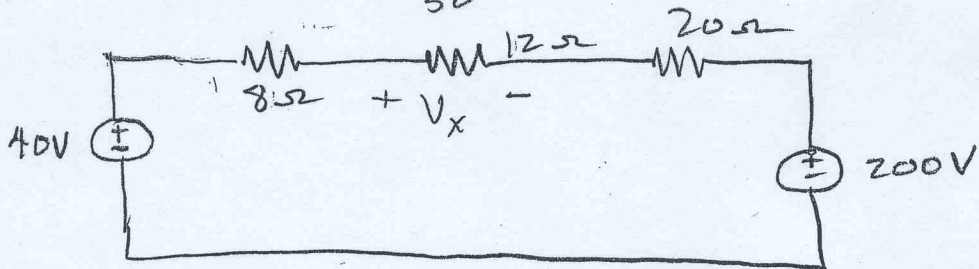
$$i = \frac{1 \times 5}{9} = \frac{5}{9} \text{ A}$$

$$i = 0.555 \text{ A}$$

4.27 Apply source transformation to find V_x .



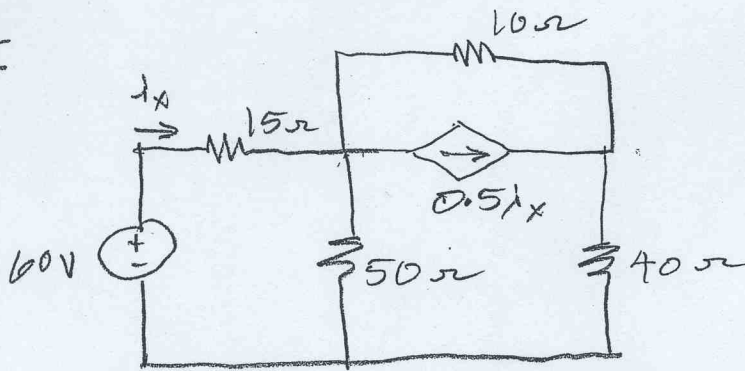
$$10 \parallel 40 = \frac{400}{50} = 8\Omega$$



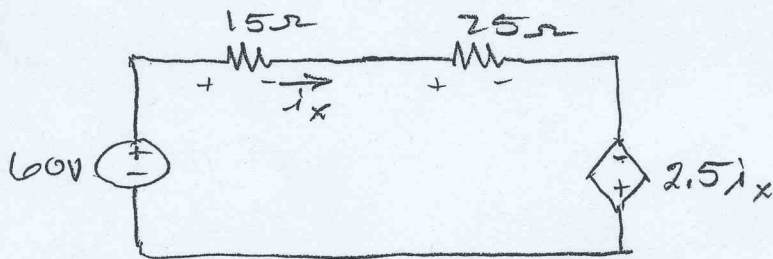
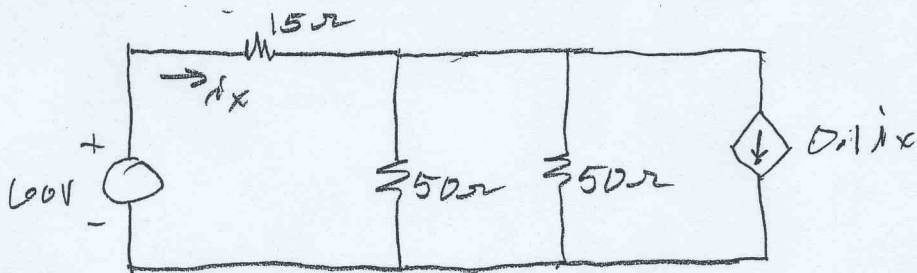
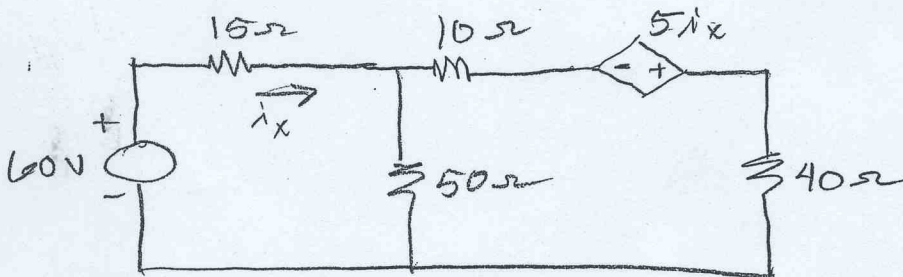
Voltage Division;

$$V_x = \frac{-160 \times 12}{12 + 8 + 20} = -48V$$

4.32



Find i_x using source transformation.



$$-60 + 40i_x - 2.5i_x = 0$$

$$i_x = \frac{60}{37.5} = 1.6 \text{ A}$$

$$i_x = 1.6 \text{ A}$$