

# Lecture 11

June 23, 2014

$$\frac{I_x}{2} + I_1 = I_2$$

EE 220

4.19

$V_A$   $V_B$   $I_x$

$$0 = 200 - V_A - V_B - 10 - 4I_x$$

$$\frac{I_x}{2} = I_2 - I_1$$

$$V_B = 27 \cdot I_2$$

$$V_A = 3 \cdot I_1$$

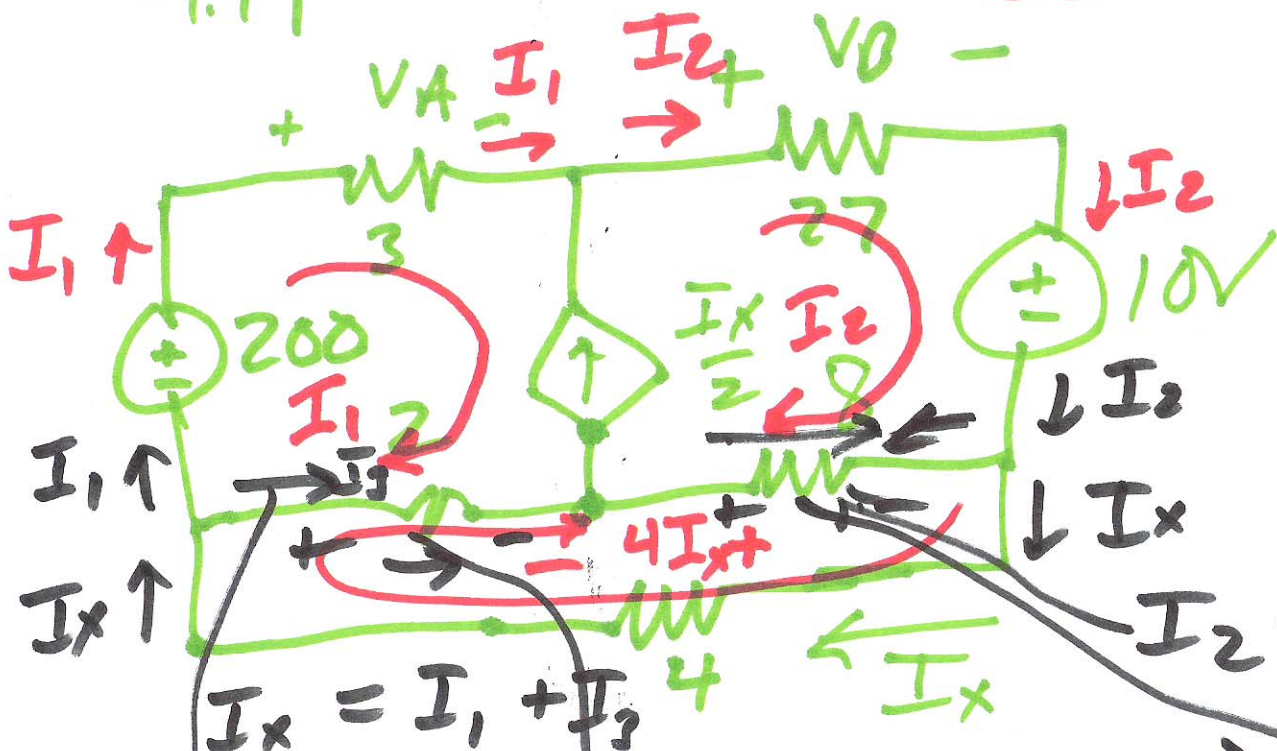
$$4I_x + 3(I_x - I_1)$$

$$+ 8(I_x - I_2)$$

$$(I_x - I_2) \cdot 8 = 0$$

$$3(I_x - I_1)$$

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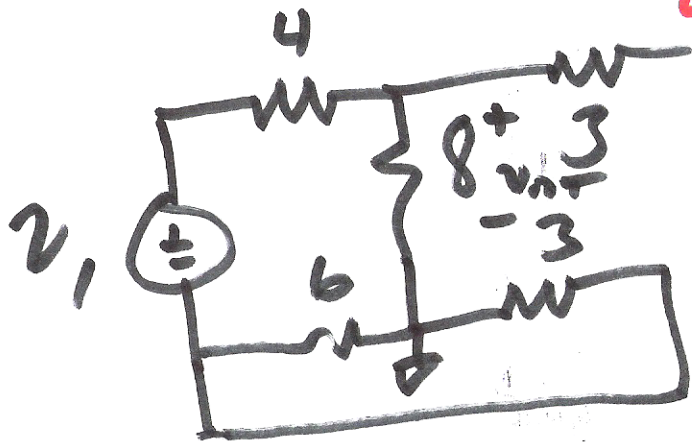
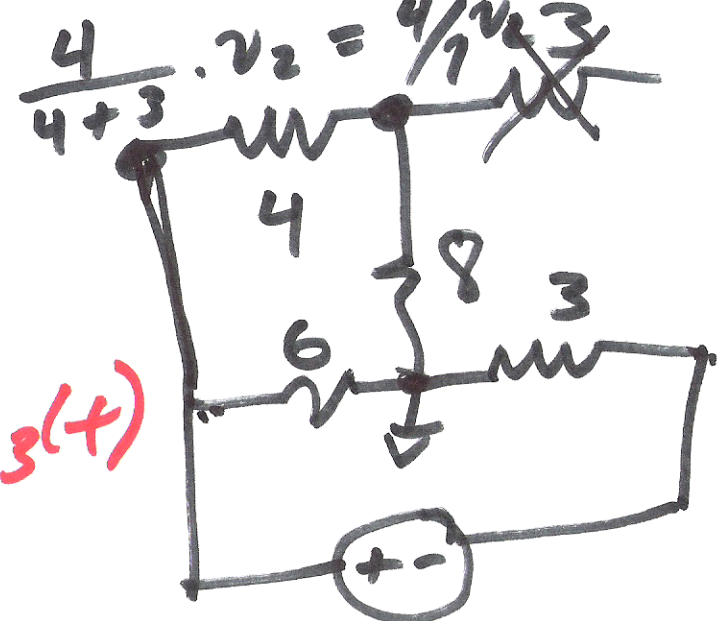
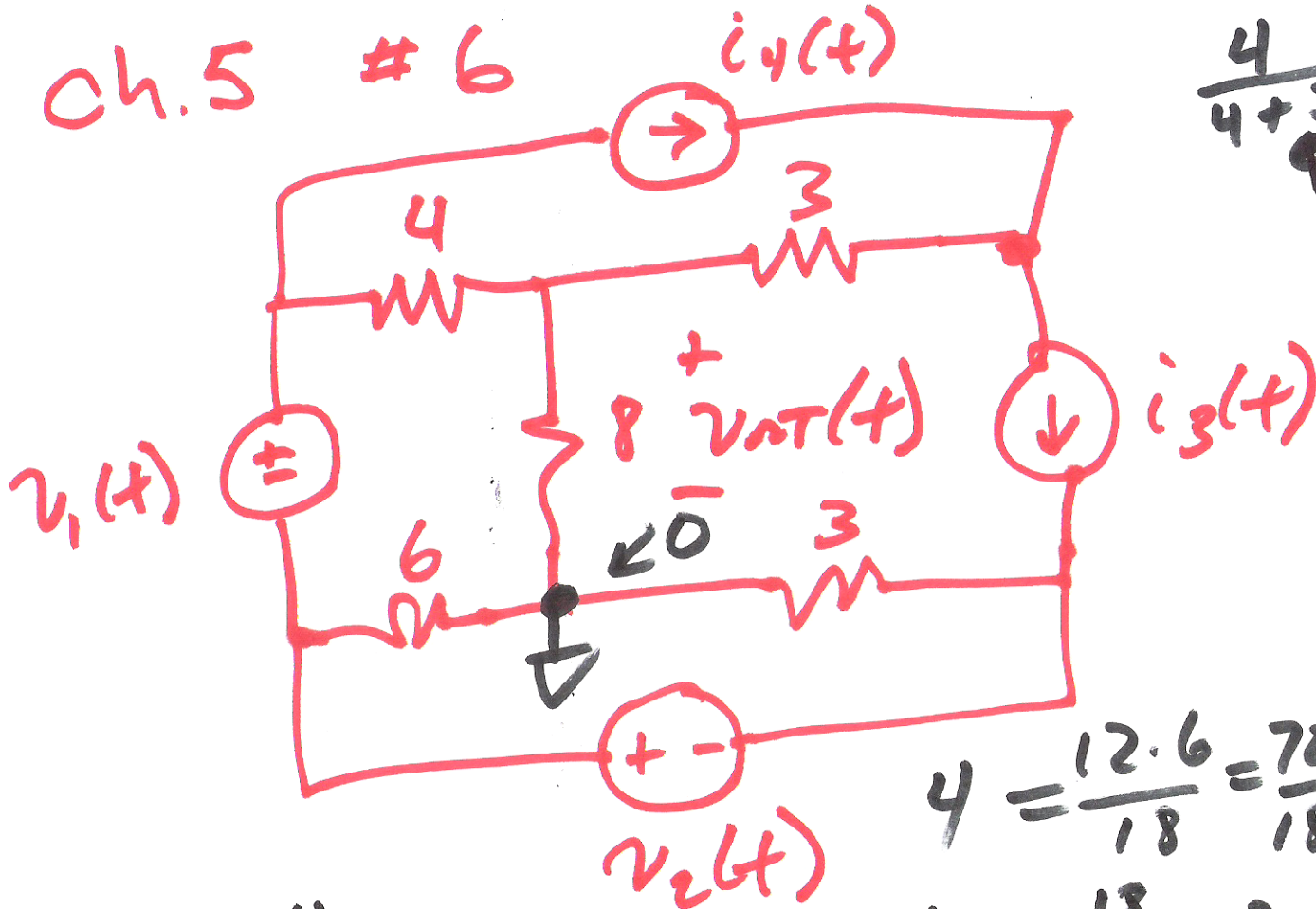


$$I_x = I_1 + I_3$$

$$I_x - I_1$$

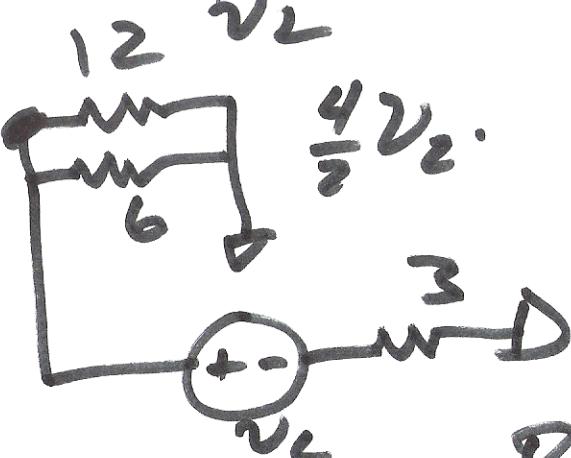
1)

Ch. 5 # 6



$$4 = \frac{12 \cdot 6}{18} = \frac{72}{18}$$

$$\frac{3 \cdot 6}{3+6} = \frac{18}{9} = 2$$

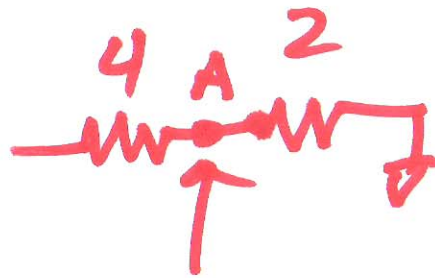
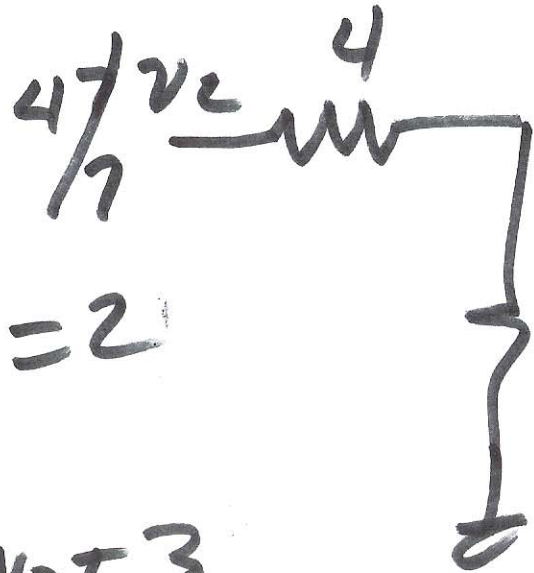


$$+ v_{OT} = 2 \cdot \frac{8}{14}$$

$$= \frac{2 \cdot 4}{7}$$

2)

$$\frac{3.6}{3+6} = 2$$

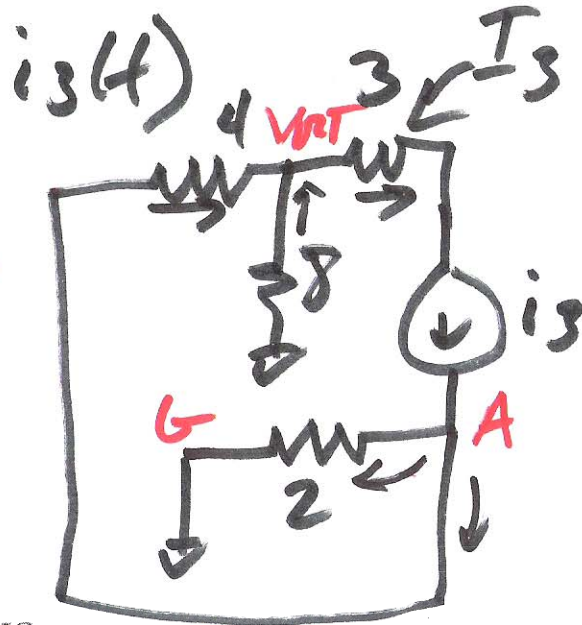
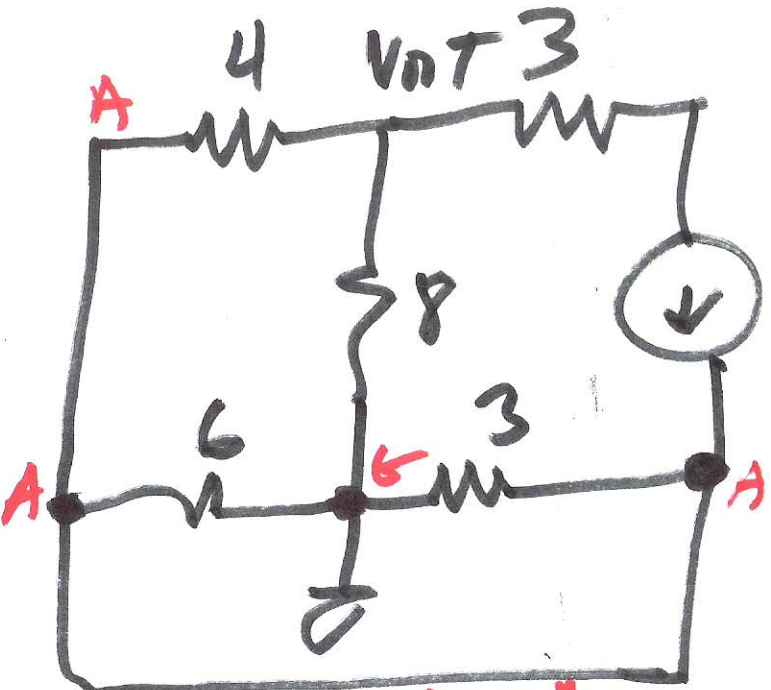


$$8 + 2 \text{ ohm} = \frac{8}{8+4} \cdot \frac{4}{7} V_2$$

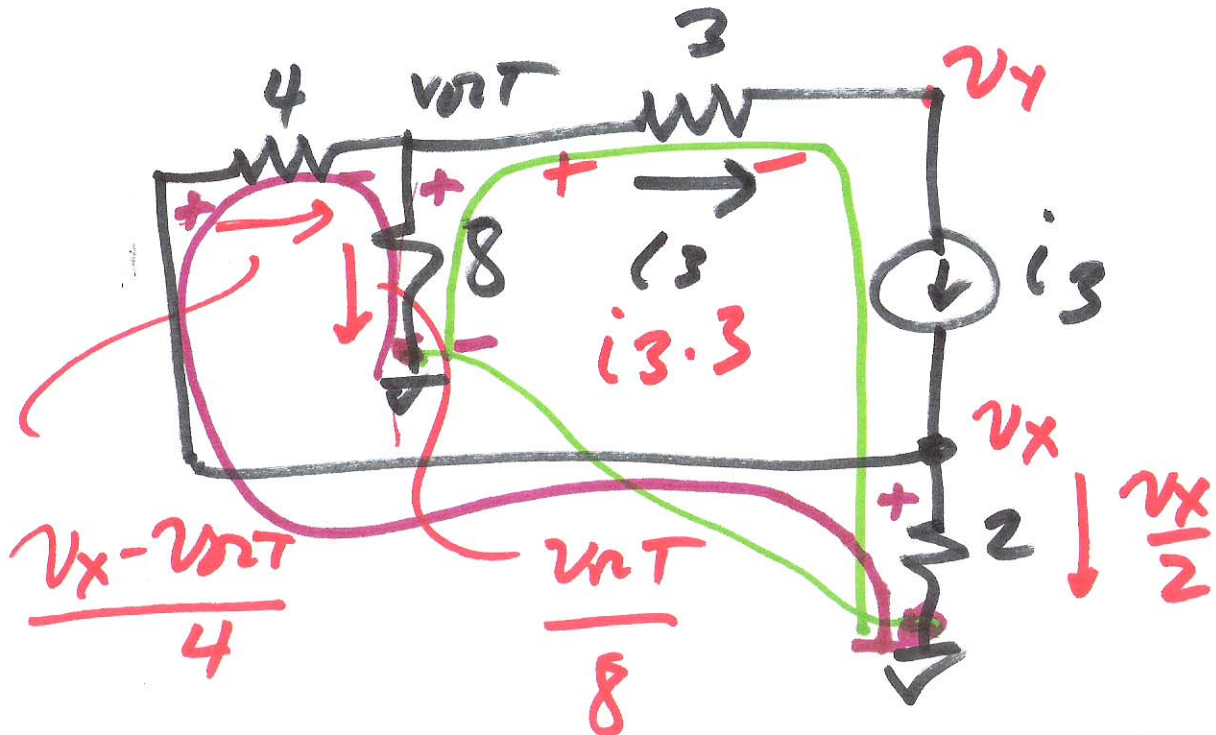
$$\frac{32}{84} V_2$$

$$\frac{16}{42} \rightarrow \frac{8}{21} V_2$$

$$-0.381 V_2 + 0.51 V_1$$



3)



$$i_3 = \frac{v_x}{2} + \frac{v_x - v_{out}}{4} = \frac{v_x}{2} + \frac{v_{out}}{8} + i_3$$

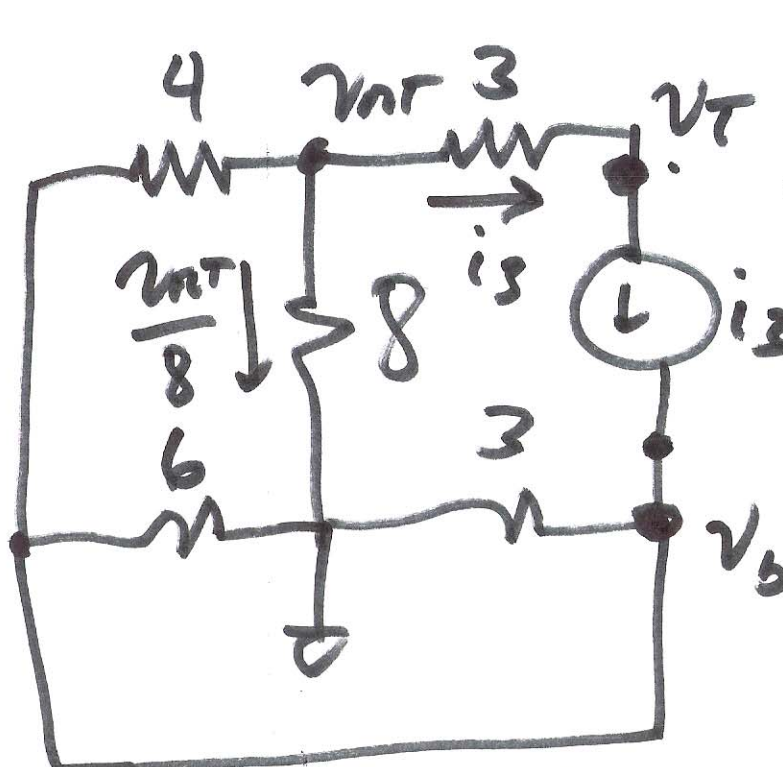
$$v_x = -\frac{1}{4} v_{out}$$

$$\frac{v_x}{2} = -\frac{v_{out}}{8}$$

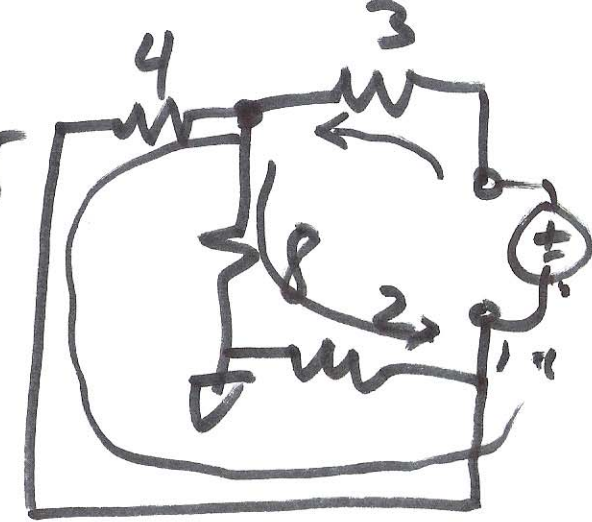
$$v_x = -\frac{2}{8} v_{out}$$

$$v_x + v_{out} +$$

4)



BLT3  
 $+ i_3 \cdot 5.85$   
 $-$

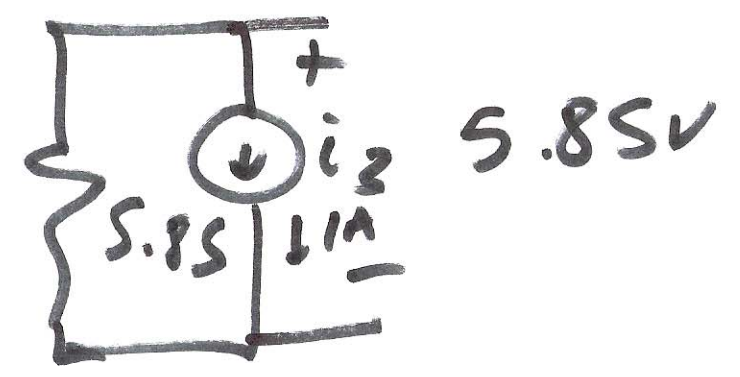
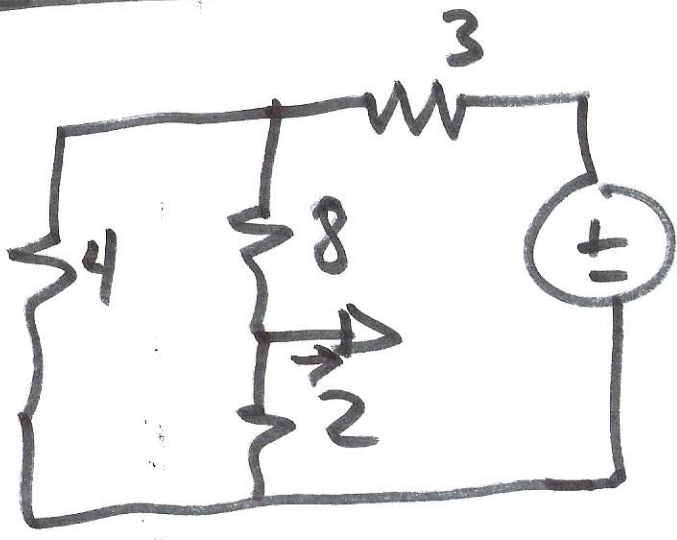


$$3 + 4 \parallel 10$$

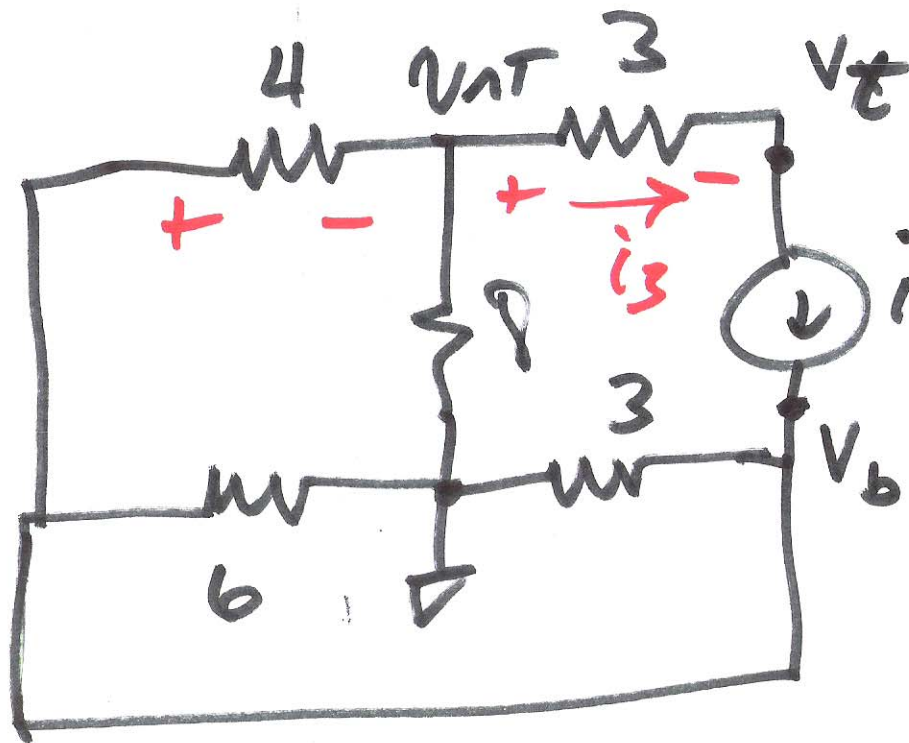
$$\downarrow$$

$$\frac{40}{14}$$

$$R_{EQ} = 5.85$$



51



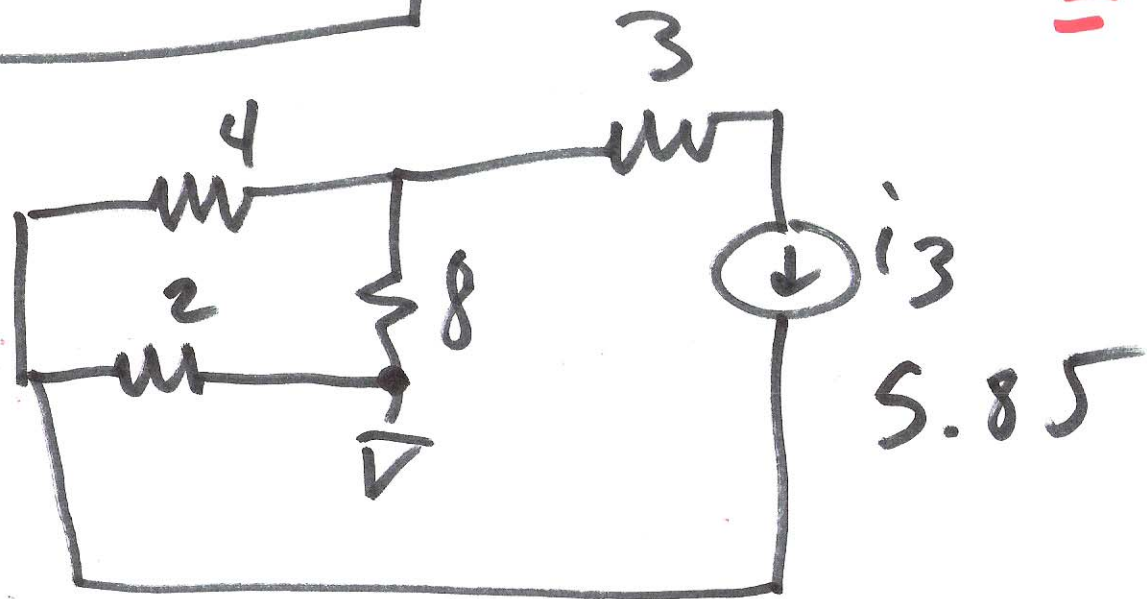
$$i_3 = \frac{V_{1T} - V_T}{3} \text{ A}$$

$$i_3 = 5.85 \text{ A}$$

$$-i_3 = \frac{V_b}{2} + \frac{V_b - V_{1T}}{4}$$

$$V_b - V_{1T} + V_{1T} - V_T$$

$$= i_3 \cdot 5.85$$



b)

$$i_3 = \frac{V_{out} - V_T}{3} \rightarrow V_T = V_{out} - 3$$

$$i_B \cdot 5.85 = V_T - V_B$$

$$i_3 = \frac{V_b}{2} + \frac{V_b - V_{out}}{4}$$

$$V_{out} = 2 + 8.85 + 4.425$$

$$5.85 = V_{out} - 3 - V_B$$

$$V_{out} = \frac{2}{3}(10.85 + 4.425) \quad V_B = (8.85 - V_{out})$$

$$2 = \frac{1}{2}(V_{out} - 8.85) + \frac{1}{2}(\cancel{V_{out}} - 8.85 - \cancel{V_{out}})$$

$$\cancel{2} = \cancel{V_{out}} - 8.85 - 3$$

$$2 = V_{out} - 8.85 + \frac{V_{out}}{2} - 4.425$$

$$V_{out} = 15.275$$

$$1 = \frac{V_{out} - V_T}{3}, \quad V_T = V_{out} - 3$$

$$-5.85 = V_T - V_B = V_{out} - 3 - V_B$$

$$4 = 2V_B + V_B - V_{out}$$

$$V_B = V_{out} - 8.85$$

$$4 = 3(V_{out} - 8.85) - V_{out}$$

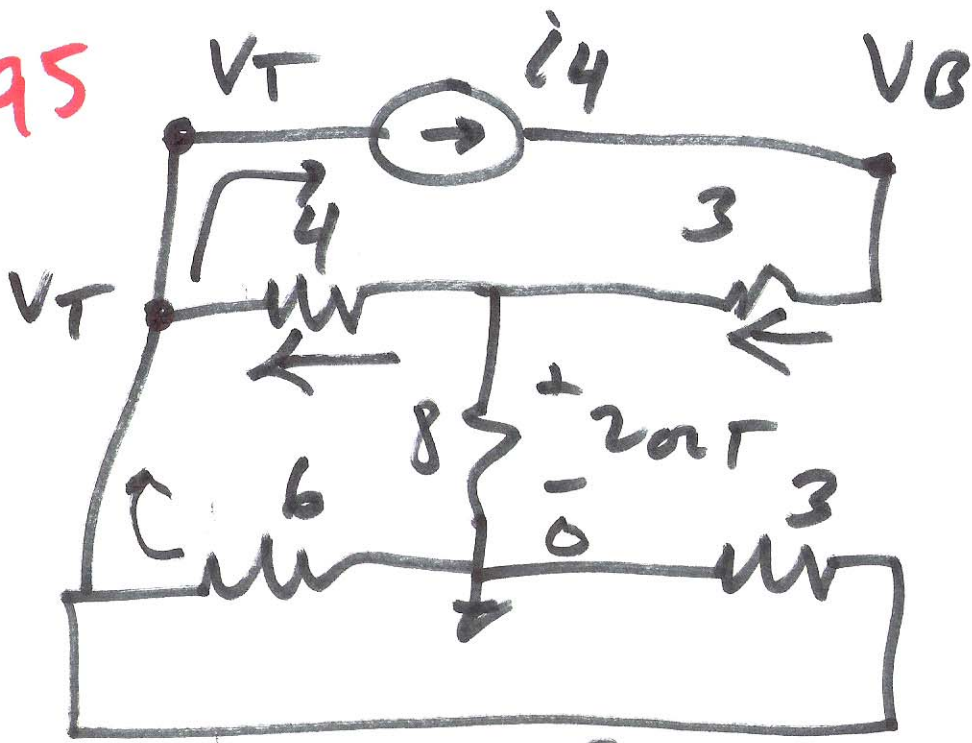
$$4 + 3 \cdot 8.85 - 2.85 = 2V_{out}$$

~~$$V_{out} = 15.275$$~~

~~$$-2.275V$$~~



$57 = 95$   
 $381$   
 $151275$   
 $-2.275$   
 $+2.275$

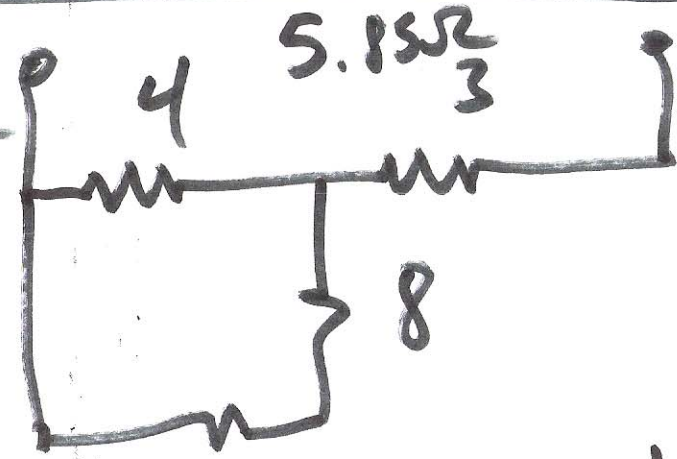


$$i_4 = 1$$

$$V_T - V_B = -5.85$$

$$\frac{V_B - V_{NT}}{3} = 1$$

$$V_{NT} = -6.275$$



$$1 = \frac{V_{NT} - V_T}{4} + \frac{0 - V_T}{2}$$

$$V_B = V_T + 5.85$$

$$V_T + 5.85 - V_{NT} = 3$$

$$V_{NT} = V_T - 2.85$$

$$V_T = V_{NT}$$

$$4 + 3(2.85) = -2V_{NT} 2$$

$$4 = V_{NT} - V_{NT} + 2.85$$

$$-2(V_{NT} + 2.85) = -2.85$$

a)