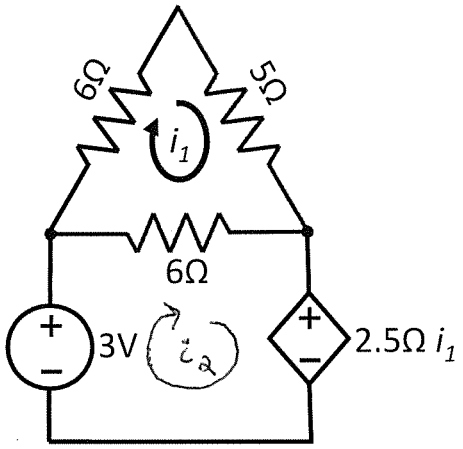
ECSE-200 Quiz # 4 ($\log_{14}(6103515625)$ Oct 2018)

NAME_____ McGill ID#_____

READ each question carefully. Do your work independently. SHOW ALL YOUR WORK. Give units on your answers (where appropriate).

Consider the circuit diagram below. Answer the questions.



1) How many mesh current variables are required to solve the circuit above? [2pts]

2) Write down the mesh current equation(s). [2pts]

3) What is the value of i_1? [1pt]

4) How much power does the 6 Ω resistor (located at the bottom edge of the triangle) absorb? [1pt]

1) two mesh currents [+2]

2) $0 = 5\Omega\, i_1 + 6\Omega\,(i_1 - i_2) + 6\Omega\, i_1$ [+1]

$0 = 2.5\Omega\, i_1 - 3V + 6\Omega\,(i_2 - i_1)$ [+1]

3) $0 = 17\, i_1 - 6\, i_2$

$3 = -3.5\, i_1 + 6\, i_2$

$$i_1 = \frac{\begin{vmatrix} 0 & -6 \\ 3 & +6 \end{vmatrix}}{\begin{vmatrix} 17 & -6 \\ -3.5 & +6 \end{vmatrix}} = 0.222\,A \text{ [+1]}$$

4) $$i_2 = \frac{\begin{vmatrix} 17 & 0 \\ -3.5 & 3 \end{vmatrix}}{\begin{vmatrix} 17 & -6 \\ -3.5 & +6 \end{vmatrix}} = 0.630$$

$P_{abs} = (i_1 - i_2)^2\, 6\Omega$

$= 0.996\ W$