EE301 Feb. 5, 2010
Quiz 2 – No Calculators – pencil (or pen) and paper only

Problem 1:
Show your work and fully simplify for full credit.

\[ V_5 \]

Given:
\[ V_1 \]
\[ R_1 = \frac{R}{4} \]
\[ R_2 = 3R \Omega \]
\[ R_3 = R \Omega \]

Find:
1. The equivalent resistance in terms of R.
2. The current through the voltage source in terms of \( V_5 \) and R
3. Proportion of \( V_5 \) dropping across each resistor using voltage division (not Ohm’s Law).
4. The current through each resistor using current division (not Ohm’s Law).

\[ R_{eq} = \frac{R}{4} + \frac{3R}{4} = \frac{4R}{4} = R \]

\[ i_{R1} = \frac{V_5}{R_{eq}} = \frac{V_5}{R} \]

\[ i_{R2} = \frac{1}{R_{eq}} \cdot \frac{V_5}{R_{eq}} = \frac{1}{R} \cdot \frac{V_5}{R} = \frac{V_5}{R^2} \]

\[ i_{R3} = \frac{1}{R_{eq}} \cdot \frac{V_5}{R_{eq}} = \frac{1}{R} \cdot \frac{V_5}{R} = \frac{V_5}{R^2} = \frac{1}{R} \cdot i_{R1} \]

\[ \Delta V = V_5 - \frac{3R}{4} \cdot \frac{V_5}{R} = \frac{1}{4} \cdot V_5 = \frac{1}{4} \cdot i_{R1} \]