Week-1 Tutorial

1.

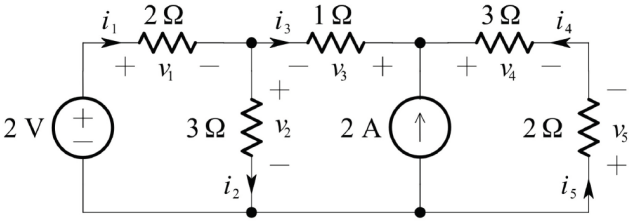
The current through a given circuit element is given by $i(t) = 2e^{-t}$ A. Graph the current and find the net charge that passes through the element in the interval from $t = 0$ to $t = \infty$.

2.

Compute the resistance of a copper wire having a diameter of 1.5 mm and a length of 5 m, given $\rho_{\text{copper}} = 1.7 \times 10^{-8}\ \Omega \cdot \text{m}$.

3.

Consider the circuit shown below:



(a) If $v_1 = -\frac{2}{3}$ V, find i_1.

(b) If $v_2 = \frac{8}{3}$ V, find i_2.

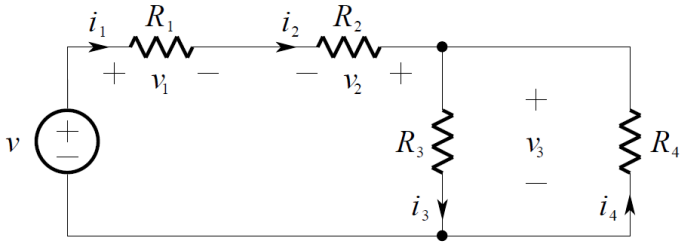
(c) If $v_3 = \frac{11}{9}$ V, find i_3.

(d) If $v_4 = \frac{4}{3}$ V, find i_4.

(e) If $v_5 = -\frac{14}{9}$ V, find i_5.

4.

Consider the circuit shown below:



(a) If $i_1(t) = -e^{-2t}$ and $v_1(t) = -2e^{-2t}$, find R_1.

(b) If $i_2(t) = -e^{-2t}$ and $v_2(t) = 6e^{-2t}$, find R_2.

(c) If $i_3(t) = -\frac{2}{3}e^{-2t}$ and $v_3(t) = -2e^{-2t}$, find R_3.

(d) If $i_4(t) = \frac{1}{3}e^{-2t}$ and $v_3(t) = -2e^{-2t}$, find R_4.

5. The total charge q(t) in some material is described by the function given below:

Find the current i(t) and draw it.