HOMEWORK #1

1. a) Solve the following simultaneous equations for v_1 and v_2:

$$6v_1 - v_2 = 39$$

$$\frac{5(v_2 - v_1)}{9} + \frac{v_2}{3} = -6$$

b) Solve the following simultaneous equations for R_1 and R_2:

$$\sqrt{R_1 + R_2^2} = 5R_2$$

$$\frac{1}{\frac{1}{R_1} + \frac{1}{R_2}} = \frac{24}{25}$$

2. Complete the following table showing products of prefixes for engineering units:

·	M	k		m	μ	n
M	T			k		
k						
					μ	n
m			m			
μ						f
n	m			p		

Note: T = 10 12, G = 10^9, M = 10^6, k = 10^3, blank = 10^0,
m = 10^{-3}, μ = 10^{-6}, n = 10^{-9}, p = 10^{-12}, f = 10^{-15}, a = 10^{-18}

3. This problem addresses the power and energy consumed by a circuit component.

a) Compute the power as a function of time consumed by a resistor with the following current and voltage waveforms versus time:

$$i(t) = 2 + 3\cos(2\pi t - 45°) \text{ A}$$

$$v(t) = 4 + 6\cos(2\pi t + 45°) \text{ V}$$

b) Find the energy consumed by the component described in (a) in the first second. Note: Convert the 45° to radians before integrating.

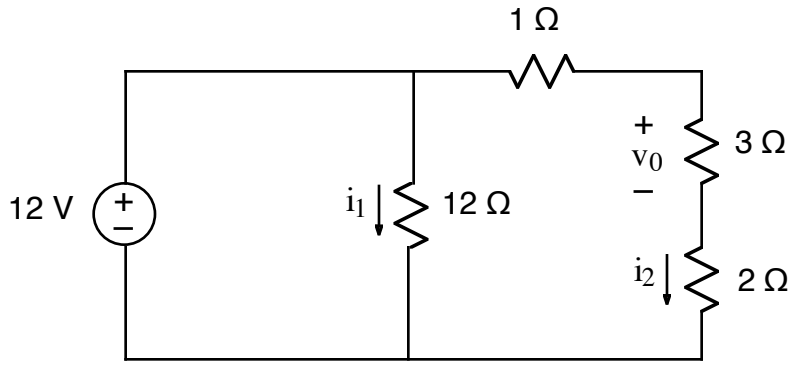
4. Perform the following calculations, and write the answers with appropriate prefixes (such as μ, m, k, etc.) for engineering units:

a) $p = 2.3\ \mu A \cdot 110\ kV$

Note: V·A = W

b) $R = 1.3\ M\Omega + 200\ k\Omega$

5.



Using the passive sign convention, complete the labeling of all currents and voltages for the resistors in the above circuit.