ECE 35 (sample)

Name: _____

Waiver Exam

PID: _____
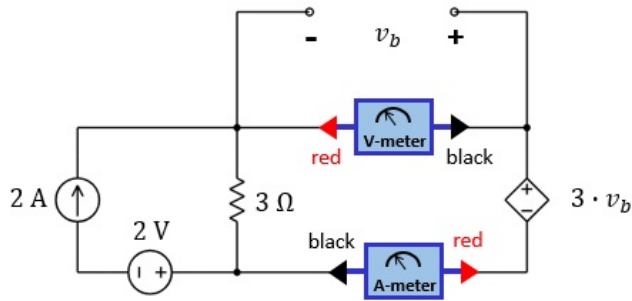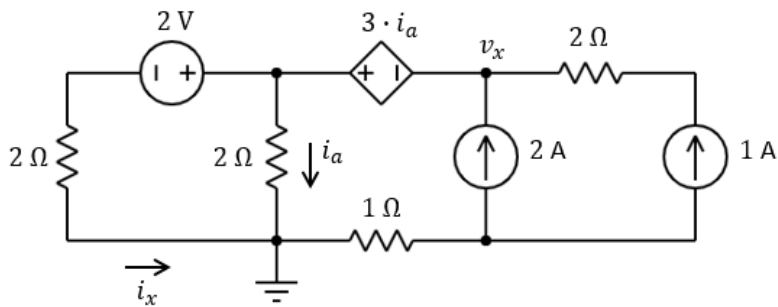
1. In the problem below, both the volt meter and the ammeter are ideal.

    (a) What is the reading X of the ammeter?

    (b) What is the reading Y of the volt meter?

    (c) What is the power P_1 supplied by the current source?

2. Consider the circuit below. You must use mesh analysis.

    (a) Find i_x.

    (b) Find the node voltage v_x.

3. For $t < 5$ s, the switch is open, and you may assume the system has reached steady state. The switch closes at time $t = 5$ s.

(a) Find $i_a(5^-$ s).

(b) Find $i_a(t)$ for $t > 5$ s. Write the equation.
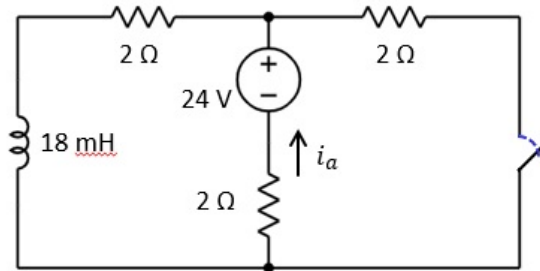
4. The AC circuit below is in steady state. The phasor diagram shows the phasor of i_S. It also shows the phasor $\mathbf{V_x}$, which is of one of the voltages v_1, v_2, or v_3 but you are not told which one. You are given that $\alpha = \frac{\pi}{3}$ and $|\mathbf{V_x}| = 8$ V.

(a) Copy the phasor diagram with the given phasors and on that same diagram draw the phasors of v_1, v_2, and v_3.

(b) What is the capacitor voltage v_2 at time $t = {}^T/_3$ where T is the period of the AC current source i_S?

(c) What is the amplitude of the voltage v_1 across the current source if the frequency of i_S is multiplied by 2 (everything else in the systems stays the same)?

(d) Sketch the waveform v_1 from part (c). The phase does not need to be exact.