

# PH 223 Week 6

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The first two problems are adapted from Grant Sherer. The final problem is adapted from Chapter 28 of the *Student Workbook for Physics for Scientists and Engineers*.

## Activity 1

Three  $45\ \Omega$  resistors are in parallel, connected to a  $21\ \Omega$  resistor in series with a battery of potential difference  $9\ \text{V}$ .

- (a) Draw a diagram of the circuit and a voltage diagram for at least one loop.
- (b) Write loop and junction rules that completely characterize the circuit. (Use each resistor in at least 1 loop rule and 1 junction rule.)
- (c) Find  $R_{eq}$ .

## Activity 2

Sketch a circuit that uses any number of  $12\ \Omega$  resistors to create an equivalent resistance of:

- (a)  $60\ \Omega$
- (b)  $3\ \Omega$
- (c)  $10\ \Omega$

## Activity 3

- (a) Draw a circuit for which the Kirchhoff's loop law equation is

$$6\ \text{V} - I \cdot 2\ \Omega + 3\ \text{V} - I \cdot 4\ \Omega = 0.$$

Assume that the analysis is done in a clockwise direction.

- (b) A voltage diagram is shown below for a different circuit. The current in the circuit is  $2.0\ \text{A}$ . Draw the circuit diagram and identify the points on the circuit diagram that are on the voltage diagram.

