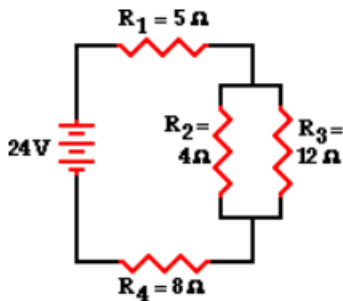


**Homework 3: Basic Circuitry and Flight Dynamics**

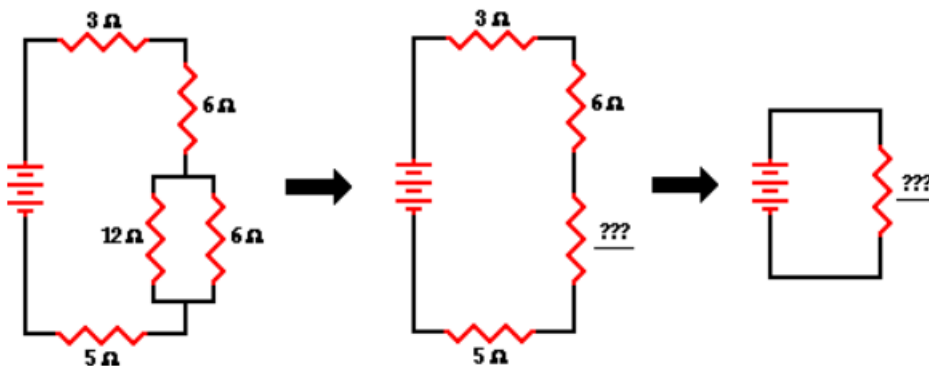
The due date is November 9 (Friday) by 5PM in the ET 408 as a hard copy. Please label your homework with your name, ID number and lab session day and time! Use the Homework Guideline from course website to format your homework. Please insert your homework in the correct lecture section box.

1. (a) Analyze the following circuit to find the variables listed. Show your calculations.



$R_{tot} =$ _____	$I_{tot} =$ _____
$I_1 =$ _____	$\Delta V_1 =$ _____
$I_2 =$ _____	$\Delta V_2 =$ _____
$I_3 =$ _____	$\Delta V_3 =$ _____
$I_4 =$ _____	$\Delta V_4 =$ _____

- (b) Given the following circuit diagram use the concept of equivalent resistance to determine the resistances marked unknown. Show your calculations.



2. Match the appropriate flight controller input with the corresponding quadcopter motion:

Roll	
Pitch	
Yaw	
Increase in elevation	

3. Complete problem 3.4 from the textbook (Book 11, 4<sup>th</sup> Edition): If the total lift force of 2.86 lbs (i.e. the same as  $2.86 \text{ lbs} \cdot 32.2 \text{ ft/s} = 92.09 \text{ lbs} \cdot \text{ft/s}$ ) is generated by the four motors, determine the angle of tilt  $\alpha$  (with respect to horizontal plane) required to produce horizontal acceleration  $a_x = 0.75 \text{ ft/s}^2$ . The quadcopter weighs 2.42 lbs. Hint: see section 3.4.1 of the textbook.