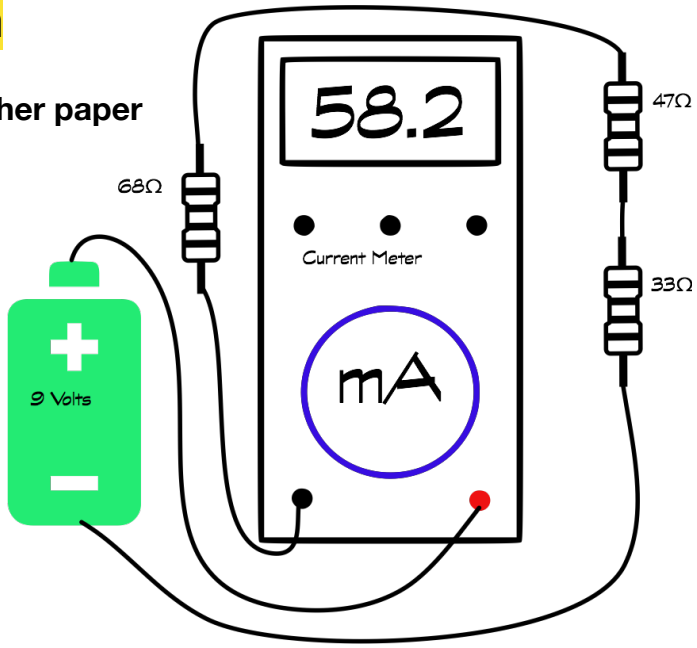
Homework for Week 2, DC Circuits - Hand in at 8am



Question 1 show all workings on another paper or preferably in your exercise book.
Examine the adjacent circuit.
Answer the questions

a) What is the calculated value of current in this circuit?

b) Is there a difference in the calculated current and the measured current and why or why not?

c) What is the total resistance of all 3 resistors?

d) What voltage will you measure across 68Ω? with current meter in circuit.

e) What voltage will you measure across 47Ω? with current meter in circuit.

f) What voltage will you measure across 33Ω? with current meter in circuit

g) Do the 3 voltages add to 9 Volts? Show addition

h) If there is a difference explain why

i) If you think some voltage is dropped across the meter, explain how this can be so

j) If in (i) you answered yes, what voltage

k) If in (i) you answered yes, what calculated resistance must the meter have?

l) Removing the current meter from the circuit, redraw circuit and show all new voltage values across 33Ω, 68Ω, 47Ω.

m) What would a suitable internal resistance be for the current meter? Why? Show example with maths.

n) State what Kirchhoffs Voltage Law is

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Question 2 show all workings

a) Calculate the value of each resistor in Ω

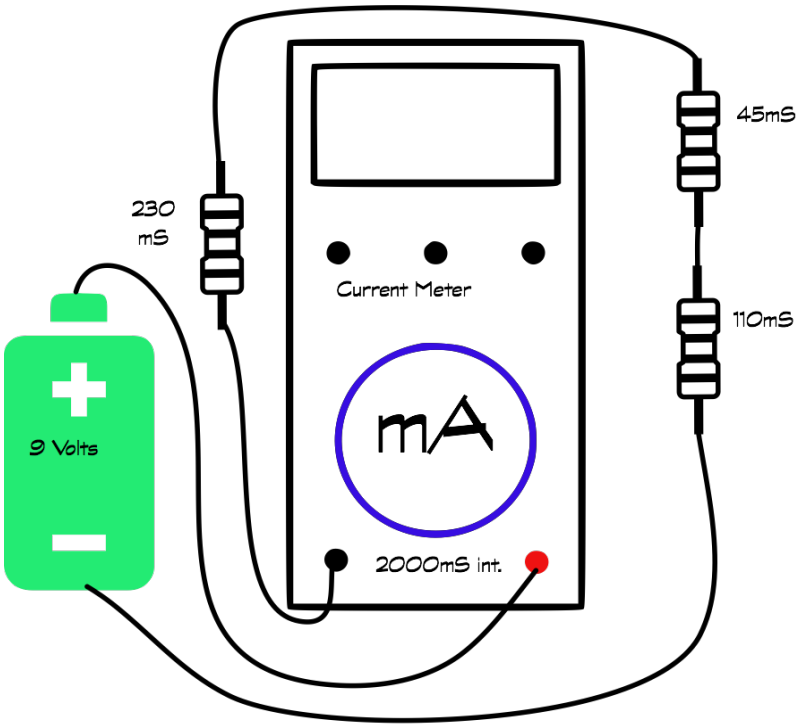
b) What is the total resistance of the 3 external resistors?

c) Calculate the resistance value of the wire conductors

d) Calculate the total resistance of the circuit.

e) What should be the circuit current then?

f) Does the current meter have any resistance?



Wires are all 45S/Metre conductance and have a total wire length of 33cm.

g) Did you include the current meter Rint. in your resistance calculations?

h) Determine with maths the proper current flow in the circuit without the meter connected in series.

i) Determine the proper voltage drop across each resistor without the current meter connected in series with the circuit.

j) Did you include the wire resistance in your calculations for (g) & (h)?

k) Including the wires in your calculations, what voltage will be lost in the circuit due to the conducting wires? (excluding meter)

l) Including the meter R, wire R, show what the measured values of current and voltage will be in this circuit.

m) If the wires were 3 Metres long, what extra voltage will be lost across the wires in the circuit?