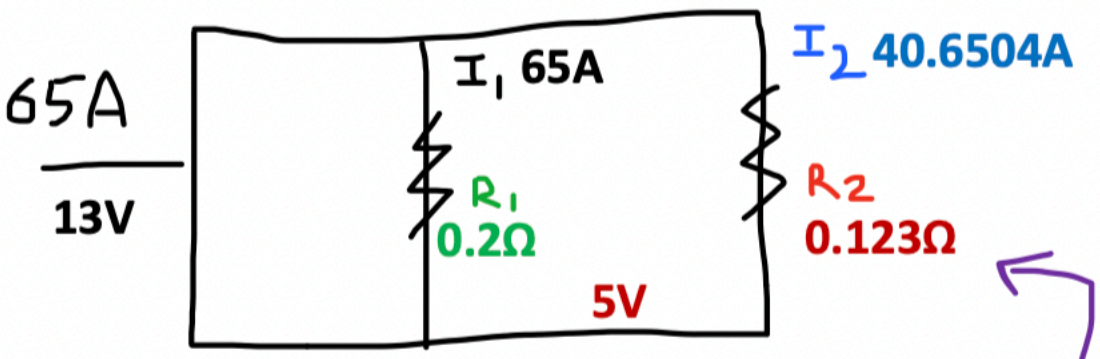
NOT WORKED OUT HOW TO DO THIS ONE YET

- A cable carries a **current of 65A** with a **13V drop**. What must the **resistance of the cable be**, when **connected in parallel** with the first cable, **to reduce the voltage drop to 5V**? **Ans. 0.125Ω**



$R_1 = U_{existing} / I_1 = 13/65 = 0.2\ \Omega$

Check: $U_{existing} = I_1 R_1 = 65 \times 0.2 = \mathbf{13\ V}$

Check: $I_1 = U_{existing} / R_1 = 13 / 0.2 = \mathbf{65\ A}$

HOW?

$R_2 = U_{new} / I_2 = 8/65 = 0.123\ \Omega$???

looks correct but is the wrong ans. According to answer sheet!

Check: $I_2 = U_{new} / R_2 = 5 / 0.123 = \mathbf{40.6504\ A}$

Check: $U_{new} = I_2 \times R_2 = 40.6504 \times 0.123 = \mathbf{5.0\ V}$

Ohm's law proof U/R = I = 5 V / 0.0761 Ω = 65.7030 A ?

Surely should add up to original ~~65A~~

=

If I plug in the given answer,
Then it results in my obtained Ω value
So I'm either missing a step somewhere?

...or I've got it arse-about-face!

Parallel
Diff **V's**
Same **I's**

$1/\ 1/R_1 + 1/R_2 = 1/R_T$

On calculator enter:

Step 1. $0.2\ x^{-1} + \mathbf{0.125}\ x^{-1} = 13$

Step 2. $13\ x^{-1} = \mathbf{0.0769\Omega}$

Ohm's law proof U/R = I = 5 V / 0.0769 Ω = 65.0195 A

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Total resistance Product over sum version **(my numbers)**

(0.2 x 0.123) / (0.2 + 0.123) = 0.0761

Total resistance Product over sum version **(book numbers)**

(0.2 x **0.125**) / (0.2 + **0.125**) = 0.0769