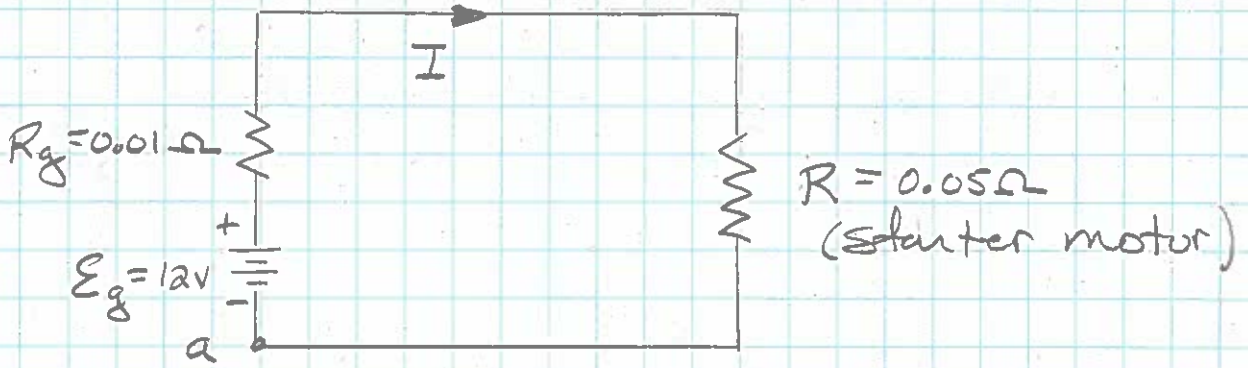
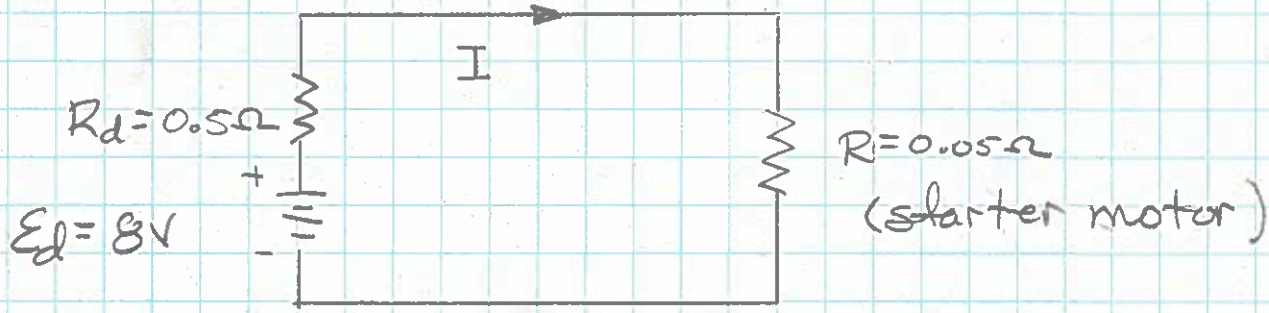
a.) Circuit with just good battery:



loop from ⓐa: $\mathcal{E}_g - IR_g - IR = 0$

$$I = \frac{\mathcal{E}_g}{R_g + R} = \underline{200\,A}$$ which will start the motor

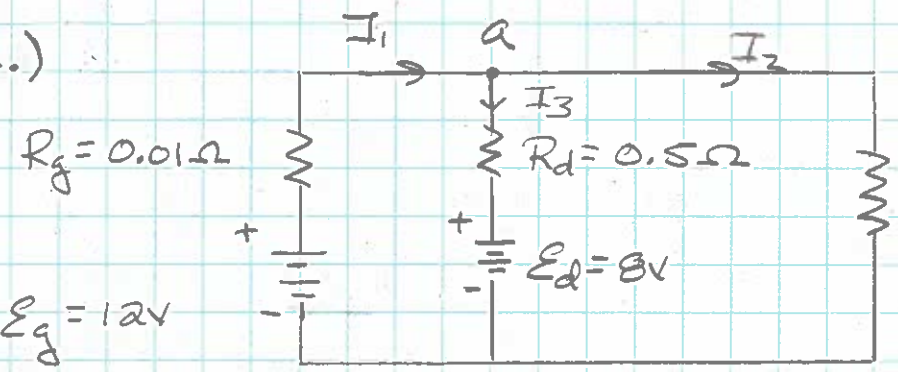
b.) with just dead battery:



Same loop as part a:

$$I = \frac{\mathcal{E}_d}{R_d + R} = \underline{14.54\,A}$$ which won't start the motor.

c.)



Here, I_2 goes to the motor to start the car and I_3 goes to charge the dead battery.

· We have to solve the fuel circuit for $I_1, I_2, \& I_3$

Junction at a: $I_1 = I_2 + I_3$ (1)

Left loop @ a: $-I_3 R_d - \mathcal{E}_d + \mathcal{E}_g - I_1 R_g = 0$ (2)

Right loop @ a: $-I_2 R + \mathcal{E}_d + I_3 R_d = 0$ (3)

Subst. (1) → (2):

$$-I_3 R_d - \mathcal{E}_d + \mathcal{E}_g - (I_2 + I_3) R_g = 0$$

or, $-I_2 R_g - I_3 (R_d + R_g) = \mathcal{E}_d - \mathcal{E}_g$ (2')

and $-I_2 R + I_3 R_d = -\mathcal{E}_d$ (3)

– 2 equ'ns & 2 unknowns.

Put in the numbers:

$-0.01 I_2 - 0.51 I_3 = -4$ (2')

$-0.05 I_2 + 0.5 I_3 = -8$ (3)

equn (2') → $I_2 = \frac{4 - 0.51 I_3}{0.01}$

Subst. → (3)

$$-0.05\left(\frac{4 - 0.51 I_3}{0.01}\right) + 0.5 I_3 = -8$$

$$-5\,(4 - 0.51\, I_3) + 0.5 I_3 = -8$$

$$-20 + 2.55 I_3 + 0.5 I_3 = -8$$

$$I_3 = \frac{20 - 8}{3.05} = \underline{3.934A}$$ to charge the dead battery

and,

$$I_2 = \frac{4 - 0.51 I_3}{0.01} = \underline{199.57A}$$ to start the motor.

and, $I_1 = I_2 + I_3 = \underline{203.5A}$