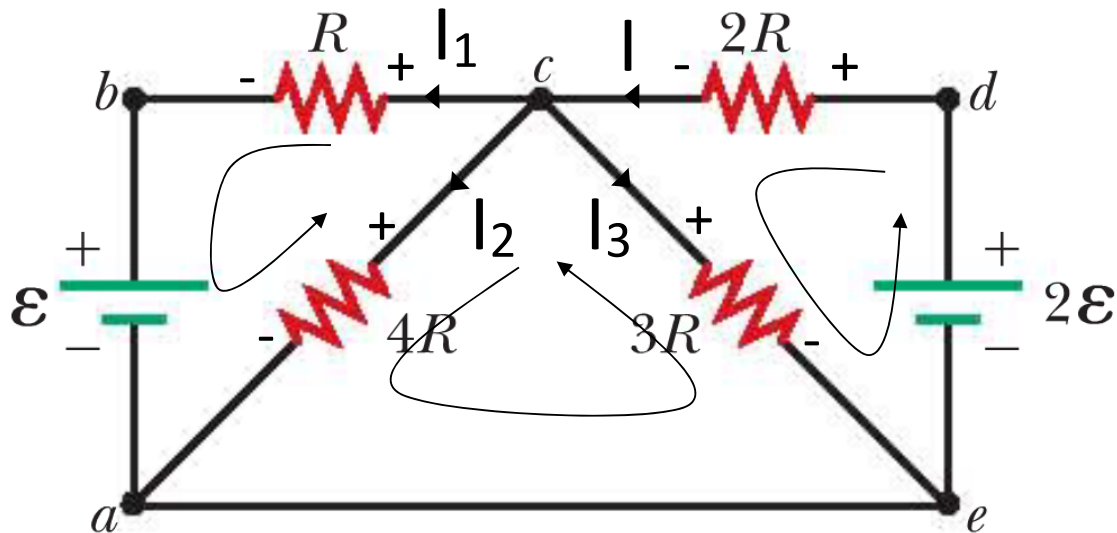


Name: _____

PHY 232 Summer 2016 Class Work
Class 20. Kirchhoff's Rules



- (a) Apply Kirchhoff's Current Rule, relationship between I , I_1 , I_2 , and I_3 :

$$I = I_1 + I_2 + I_3$$

- (b) Apply Kirchhoff's Voltage Rule to loop cba:

$$I_1 R + \varepsilon - (I_2)(4R) = 0$$

- (c) Apply Kirchhoff's Voltage Rule to loop cae:

$$(I_2)(4R) - (I_3)(3R) = 0$$

- (d) Apply Kirchhoff's Voltage Rule to loop dce:

$$(I)(2R) + (I_3)(3R) - 2\varepsilon = 0$$

- (e) Apply Kirchhoff's Voltage Rule to loop baed:

$$\varepsilon - 2\varepsilon + (I)(2R) + I_1 R = 0$$

- (f) Out of the five equations (a) to (e) above, how many of them are independent?

We have written five equations, and can easily write several more by choosing other loops, but there should be only four independent equations out of so many equations, because we have only four unknowns (I , I_1 , I_2 , and I_3).