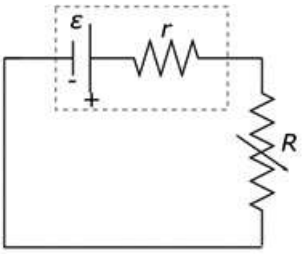
NAME _____ DATE _____

Scenario

A battery ε has internal resistance r and is connected to a variable resistor as shown.



Quantitative Analysis

PART A:

i. As the resistance of the variable resistor is increased, which of the following quantities stays the same?

_____ I _____ ε _____ r _____ All quantities stay the same.

ii. As R is increased, does the potential difference measured across the battery increase, decrease, or remain the same? Explain.

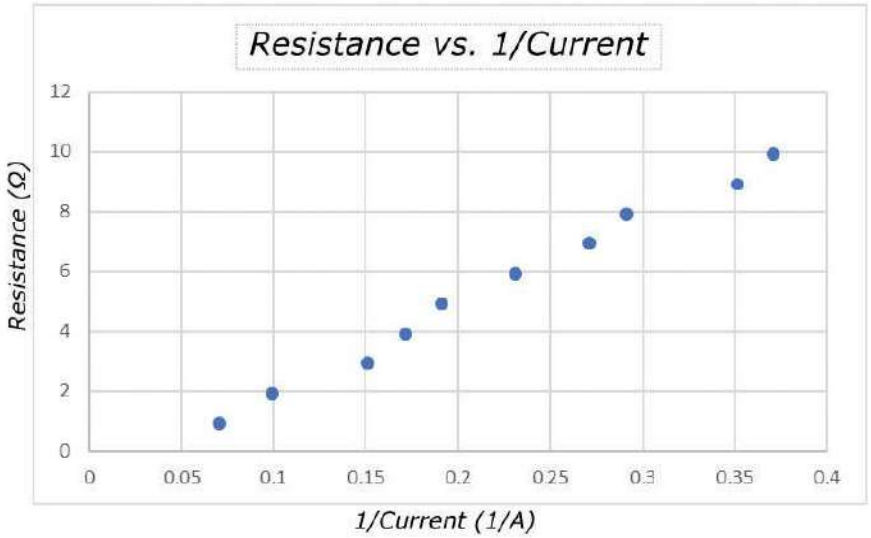
_____ Increase _____ Decrease _____ Remains the same

PART B:

i. Use Kirchhoff's loop rule to write an equation for the potential drops around the circuit in terms of ε, I, r, and R.

ii. Rewrite the equation from Part B (i) to solve for R as a function of I.

Dominique records the current through the variable resistor as a function of the resistance and collects the following data.



PART D: Draw a best-fit line and determine the slope.

PART E: What is the physical meaning of the slope?

PART F: Determine the y-intercept. What is the physical meaning of the y-intercept?