Kinetic Friction Lab
Please do all this on a separate page!

An object of mass *m* is being pulled by an applied force *F*.
The object is moving at a constant velocity.
The coefficient of kinetic friction between the object and the surface is given by *μ.*

1. Derive a formula that relates the variables
F, m, μ, and *g*.

2. Using items available in the classroom, set up this situation in reality.

3a. Which variable in your formula is the independent variable?
3b. Which variable in your formula is the dependent variable?
3c. Which two variables in your formula is are controlled variables?

4. Based upon the formula that you derived, what *should* be the relationship between the . This is your hypothesis.
Independent and dependent variables
Please use one of the following terms in describing your hypothesis.
a) Linearly Proportional or Directly Proportional
b) Inversely Proportional
c) Square Proportionality
d) Inverse Square Proportionality

5. Should a transformation of data necessary to linearize the data? Why or why not?

6. Using the setup you created in #2, collect data that relates the dependent and independent variables.
Ensure that you follow the following guidelines:
- At least 18 data points
- At least 6 different values of the independent variable
- The greatest value of independent variable should be at least 4 times the least value of the independent variable.
- Do not average data. Preserve every measurement taken as its own point.

7. When you do this, don't change the part of your object in contact with the surface, or the surface you are pulling on. Why?

8. Create a table that relates the independent and dependent variables.

9. Create a scatterplot by hand that relates the dependent and independent variables.

10. Do the points fall in a pattern? If so, is this pattern consistent with your hypothesis (#4)?

11. Are there outliers (points that are vastly far out of the pattern of the other points.) If so, analyze individually what may be causing this. You can consider that your data collection may have been incorrect, but also consider the possibility that your hypothesis may only be accurate within a certain range.

12a. If the data are linear, and this is what your hypothesis predicted, please draw a best-fit line and determine its slope by hand. You may ignore outliers in making your best-fit line.
12b. From your formula, determine what physical value should equal the slope of the line.