Physics 20 Lesson 21H

“Curve Straightening” Assignment

A student performed an experiment that verified **Newton’s Universal Law of Gravitation** by measuring the attraction between two spherical masses, A and B, as a function of their separation. The measurements are shown in the table of values below:

Gravitational Force as a Function of Separation

|  |  |
| --- | --- |
| Separation (m)  | Force (x10-8 N) |
| 0.10 | 14.0 |
| 0.15 | 6.23 |
| 0.20 | 3.50 |
| 0.40 | 0.875 |
| 0.60 | 0.389 |

* Graph these measurements on Graph 1.
* Show that these results verify **Newton’s Universal Law of Gravitation** by manipulating the data and providing a new table of values that, when plotted, will produce a straight line graph.
* Plot the new data on Graph 2.
* Calculate the slope of Graph 2.
* Using the slope value, determine the mass of sphere B, if the mass of sphere A is 3.50 kg.
* Determine the magnitude of the force between spheres A and B when they are a distance of 2.00 m apart. Use the hypothetical value of 5.00 kg for the mass of sphere B if you were unable to determine the actual value.