|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|

|  |  |  |  |
| --- | --- | --- | --- |
| **PH 201 Pre-Lab 14** | **Semester Wrap-Up** | **Name** |  |

 |
|  |
| Consider the work in a spring. The work done by a spring that is stretched or compressed is given by the relationship  |
| $$W=\frac{1}{2}kx^{2}$$ |
|  |
| W is work in joules (J), k is the spring constant in units of (N/m), and x is the stretch or compression of the spring in units of meters (m). |
|  |
| Part I – Linearize by powers: Consider an analysis with Work (W) plotted on the y-axis and the stretch of the spring squared (x2) on the x-axis. |
|  |
| 1. What are the units for: |
|  |
|

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **x-axis** |  |  | **y-axis**  |  |
|  |  |  |  |  |
| **Slope** |  |  | **y-intercept** |  |

 |
|  |
| 2. What should the Theoretical slope and y-intercept of this graph should be: |
|  |
|  |
| **Slope** |  |  | **y-intercept** |  |
|  |
| 3. If a plotted trendline of the graph is  |
| $$y=4.5 x+0.3$$ |
| Extract the spring constant from this. |
|  |
|  |
|  |
|  |
|  |
|

|  |  |
| --- | --- |
| $$k=$$ |  |

 |
|  |
| 4. What does the y-intercept for this trendline tell us? |
|  |
|  |
|  |
|  |
| **-> Over->**  |
|  |
| Part II – Linearize by logarithms: Consider an analysis with Ln (W) plotted on the y-axis and Ln (x) on the x-axis. |
|  |
| 5. What are the units for: |
|  |
|

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **x-axis** |  |  | **y-axis**  |  |
|  |  |  |  |  |
| **Slope** |  |  | **y-intercept** |  |

 |
|  |
| 6. What should the Theoretical slope and y-intercept of this graph should be: |
|  |
|  |
| **Slope** |  |  | **y-intercept** |  |
|  |
| 7. If a plotted trendline of the graph is  |
| $$y=1.8 x+0.7$$ |
| Extract the spring constant from this. |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|

|  |  |
| --- | --- |
| $$k=$$ |  |

 |
|  |
|  |
|

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | [**Dr. Donovan's Classes Page**](http://physics.nmu.edu/~ddonovan/classes.html) |  | [**Dr. Donovan's PH 201 Lab Materials**](http://physics.nmu.edu/~ddonovan/classes/ph201/ph201labwork.html) |
|  |  |  |  |  |
| [**Dr. Donovan's Main Web Page**](http://physics.nmu.edu/~ddonovan/) |  | [**NMU Physics Department Web Page**](http://webb.nmu.edu/Departments/Physics/) |  | [**NMU Main Page**](http://www.nmu.edu/) |

 |
|

|  |
| --- |
| **Please send any comments or questions about this page to** **ddonovan@nmu.edu** |
| *This page last updated on March 13, 2018* |

 |

 |