Graphing Worksheet

1) A student measures the acceleration of a lab cart as it moves at different speeds around a circular horizontal path. The data collected by the student is shown below:



When a graph of acceleration versus velocity is plotted a curve results as shown.



a) Manipulate the **velocity data** and use it to plot a straight line on the graph below. **(3 marks)**



b) Calculate the slope of this graph including units.

2) An experiment was performed on the surface of an asteroid. A mass was dropped from various heights and the time taken to fall was recorded.



a) Plot a straight line graph. **(2 marks)**



b) From your straight line graph, determine the slope of the line. (Include units.) **(1 mark)**

c) What is the acceleration due to gravity on the surface of this asteroid? **(2 marks)**

3) A force (*F*) was used to pull a wooden block across a floor as shown below.



The size of the force was varied and the data table below shows the size of the force and the

block’s resulting acceleration.



Plot the data on the graph below and draw a line of best fit. Extend the line back to the

‘y’ axis so that you have a *y*-intercept point and determine the slope of the line.



Using your slope value and your *y*-intercept value from the graph, determine the coefficient of

friction between the block and the floor.

4) A student measures the final speed of an accelerating car at various displacements.

The data collected is shown below.



Plot a graph of the final speed squared, *v*2, versus the displacement, *d*, of the car on the graph below.



Determine the slope of the line of best fit to the data and state what the slope represents. Extend the line to the *y*-axis and use the *y*-intercept to determine the initial speed of the car.

5) The following data is collected in a kinematics experiment using a toy car.



a) Plot the data on a *v* vs. *t* graph and extrapolate your line back to *t* 0. **(2 marks)**



b) What is the displacement of the toy car from *t* 0 to *t* 0.90s? **(2 marks)**

c) What does the *y*-intercept of the graph represent? **(1 mark)**

6) A small toy car is placed in a spring-loaded launcher.



The force needed to compress the spring is recorded as a function of distance.

a) Plot a graph of force vs. distance using the data table shown. **(2 marks)**





b) Calculate the area under this graph from distance 0.0m to distance 0.080m. **(2 marks)**

c) What does this area represent? **(1 mark)**

7) A student uses a wrench to apply a constant force to turn a nut. He applies the force at various angles and measures the amount of torque produced at each of the angles.



The torque data collected by the student along with the sine of the angles is shown below:



a) Plot a graph of torque versus sin on the graph below. **(2 marks)**



b) Calculate the slope of your line including units. **(1 mark)**

c) Use the slope of your graph to determine the amount of constant force the student used throughout his experiment. **(2 marks)**

8) A conducting loop is pulled at various speeds through a region of constant magnetic field strength.



A student measures the potential difference across the resistor in the loop for each trial and records the above data

a) Plot a graph of the potential difference vs. speed.



b) Calculate the slope of your graph. (Include units.) **(1 mark)**

c) What is the strength of the magnetic field? **(2 marks)**

9) In an experiment, protons are accelerated to different velocities and then subjected to a constant perpendicular magnetic field. The radii of the paths of the protons are measured against their velocities. The data is shown below.



a) Plot the data on the graph below and draw the best fit straight line. **(2 marks)**



b) Determine the slope of the line. (Include units.) **(2 marks)**

c) Electrons replace the protons in the above experiment. The slope of the line will now be:

**(1 mark)**

❑ larger than before

❑ same as before

❑ smaller than before