

Graphing Worksheet

Use Graphical Analysis to plot the graphs and to help answer the following questions:

1. The data table shows the velocity of a car during a 5.0 s interval.

t (s)	0.0	1.0	2.0	3.0	4.0	5.0
v (m/s)	12	15	15	18	20	21

- a) Plot the data and draw a best-fit straight line.

- b) Calculate the acceleration of the car.

2. During an experiment a class of physics students measure the distance of a rocket as it launches. They have several students watching to call out when the rocket reaches certain heights, while one student measures the time. Since the rocket started from rest, the following formula can be used to calculate the acceleration of the rocket...

$$d = \frac{1}{2} at^2$$

...where “time” is the time (s) of the rocket at each height, “a” is the acceleration (m/s²) of the rocket, and “d” is the distance (m) the rocket has traveled up from where it started on the launch pad.

The following information is gathered by the students.

Distance (m)	Time (s)	Time Squared (s ²)
25	2.5	
50	3.5	
75	4.3	
100	5.1	
125	5.6	
150	6.1	

- a) **Determine** the values for the final column of the table of information given above and complete the table.
- b) In the space provided below, **sketch** a graph of distance as a function of time.

- c) Plot a graph of distance as a function of time **squared** using excel and then **determine** the slope of the graph. Make sure to include units.

- d) **Explain** the significance of the slope you have calculated, and how it relates to the formula $d = \frac{1}{2}at^2$. Use your slope to **determine** the acceleration of the rocket.

3. The following data was collected

Power (W)	Time (s)	1/Time (1/s)
25	9.9	
50	5.1	
75	3.4	
100	2.4	
125	2.0	

- a) **Determine** the values for the final column of the table of information given above and complete the table.
- b) In the space provided below, **sketch** a graph of power as a function of time.
- c) Plot a graph of Power as a function of **1/Time** using excel.
- d) Determine the slope of the graph. Make sure to include units. What does the slope represent?