**Homework Assignment #2  
Due: Tuesday, March 27 by 5:00 p.m.  
(Follow homework submission requirements posted on myCourses)**

**Problem #1:**

A meteorite is briefly tracked by radar during its entry into the earth’s atmosphere. Its altitude vs. time after its initial detection is given in the table to the right. Assume that the meteorite has a roughly constant acceleration due to gravity and aerodynamic drag. Make a scatter plot of the radar tracking data and fit an appropriate trendline to it.



**Questions** to answer in addition to making your spreadsheet and plots:

1. What is the meteorite’s velocity at the time of its initial detection?
2. What is the meteorite’s deceleration during the time it was tracked on radar?
3. Predict the approximate time after detection when it will strike the ground.

**Suggestions/Hints:** Remember the formula for the motion of an object with an initial velocity and constant acceleration from basic physics. Choose and appropriate trendline type and relate the coefficients given by the trendline equation to that projectile motion formula.

**Problem #2:**

In Mechanics of Materials class, you will learn how to analyze the deflections of beams subject to loads. The solution makes use of the Heaviside Step function, *H(x, a)*, to make another function, *M(x, a, n)*, discontinuous. The combined discontinuous function, *HM(x, a, n)* is given below:

A steel beam is supported at two points and has one distributed load and one point load applied as shown in the figure below.

x

60 lb/in

1200 lb

120 in

240 in

360 in

The solution for the vertical (positive upward) deflection of this beam along its length, *v(x)*, is:

Compute and plot the deflection of the beam, *v*, vs. distance from the left end, *x*. Use increments of 1/2 inch for x.

**Questions** to answer in addition to making your spreadsheet and plots:

1. What is the maximum deflection of the beam (and in which direction)?

**Suggestions/Hints:** Break the calculation into smaller parts for ease of verifying the accuracy of your formulas.