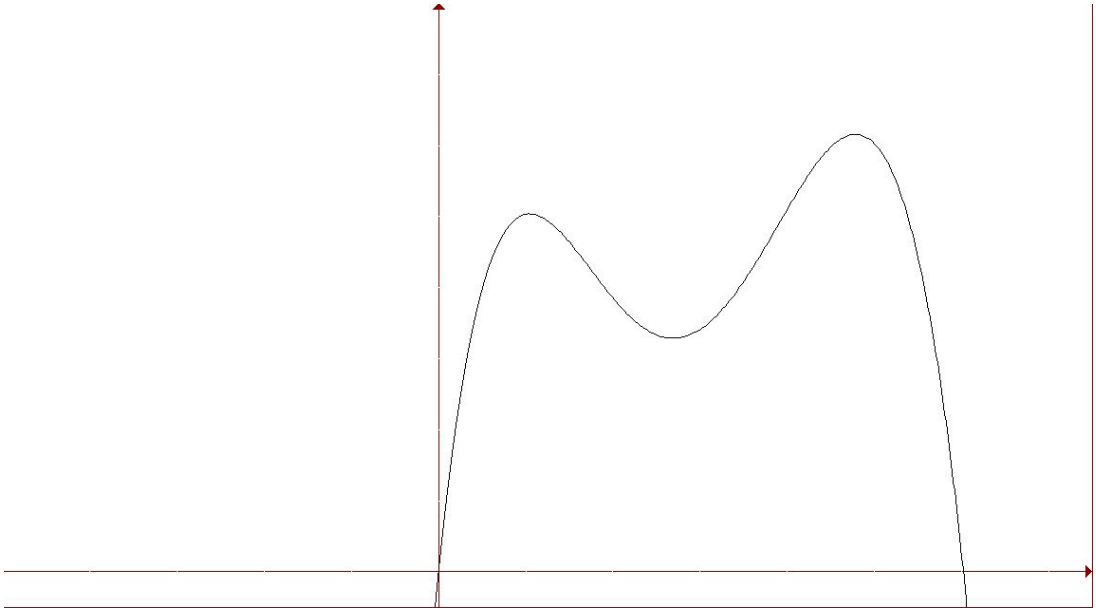
Heidi Ho Project 2001 - 2002
Calculus Laboratory 1: Speed

Heidi Ho wants to get from Bloomington, Indiana, to Columbus, Indiana. To do so, she must pass through Nashville, Indiana. Between cities the speed limit is fifty miles per hour. In Nashville, she must slow down to thirty miles per hour. If s represents Heidi Ho's speed at time t, then a graph of s versus t would like something like the figure below:



One curve that can be used to reproduce this graph quantitatively is a fifth degree polynomial; that is, an equation in the form of $s = (t-a)(t-b)(t-c)(t-d)(t-e)$. Using a curve of this form as a starting point, find a function (equation) that is close in shape to the graph above for real values of a, b, c, d, e. You may NOT use a curve fit program. Choose the equation so that $s = 0$ when $t = 0$. Be sure to use realistic times and speeds and accurately label all graphs.

Indicate in your write-up of this project the strategy you used to find the values of the factors and the effect of each factor on the shape of your graph. Also any translation or scale changes that were necessary and what you did. Write in correct, complete sentences. Include your rough drafts, mistakes, and what portion of the project each person was responsible for. You will need at least one outside source. This is equivalent to an exam grade.

You may work with a partner. This is due before the end of the first quarter. All Heidi projects must weave a Heidi story that will continue throughout each of the four quarters.