Precalculus BC **Name _____ Per: _____**
Theory Discussion #1 : Families of Functions **House Number _____**

Consider the family of functions $x^3 - 3kx$.

First, take the last (rightmost) nonzero digit of your house number and substitute that for k in the expression $x^3 - 3kx$. This is your personal house function.

Graph your house function and describe its graph carefully. Locate maxima, minima, x- and y- intercepts, points of inflection (as best you can), etc. Make sure you understand *algebraically* why your function has these properties.

Then create a slider for k whose values reach from -10 to 10. Identify which features of the graph remain as they were for your house function, which change—and how they change. Make sure you can justify each variant or invariant algebraically, and that your observations are both accurate and precise.

Use this page to write a short essay (two or three paragraphs is fine) giving your results and justification. You can use the link software that came with your calculator to print out graphs, or you can carefully hand-sketch them. Start with a paragraph describing your personal house function, then a couple of paragraphs (maybe three, no less than one) describing the properties of the family.

DUE next Tuesday or Wednesday (October 7 or 8), whichever applies to you. This is not an ordinary homework, so unless your circumstances are extraordinary, late papers will not be accepted—fax, email, or carrier pigeon them in.