# POLYNOMIAL PHOTO PROJECT

In class you've learned how to analyze functions for increasing, decreasing, domain, range, zeros, intercepts, and local extrema. Now it's time to put your knowledge to the test! But first, you need to create your own polynomial function…

Directions:
1. Open a new Geogebra file. You can download Geogebra for free on your own computer. Find the "Insert Image from" button under "Edit". Make sure you have your picture saved where you can access it. Select the picture and insert. If your picture is very small you may need to select another picture.
2. Slide your picture to a point where the coordinates of A are whole numbers, but not at the origin. At least one of the coordinates should be negative.
3. Select the "new point" button and place points along your curve. Start with points A through F.
4. In the Input bar at the bottom, type FitPoly[A, B, C, D, E, F, __] – fill in the blank with the degree of the polynomial you want (start between 2 and 5). Geogebra will fit a curve to your points. Note: if you don't want to use the endpoints (A and B) you do not need to, just exclude them.
5. To change the degree, double click on the equation and change the number in the "redefine" box. You should have higher than 2nd degree, but do not go higher than 7th degree.
6. Add points to try to increase the accuracy of your graph by using the point button, then add the letters under "redefine". If the fit gets worse or the function becomes undefined, just undo to back up. Play around with it until you get a curve you like.
7. Note: you shouldn't have zeros in front of any of your coefficients. If you see this go to "Options", select "Rounding", and change the number of decimal points.
8. When you have a graph you like, turn off the points. Do this by clicking on each point in the "Algebra" window.
9. You can change the look of your curve by pointing to the curve, right clicking, and selecting "Object Properties" (color, thickness, etc).
10. When you finish your graph, use the "snip" tool on the computer to cut and paste it into a Word document.
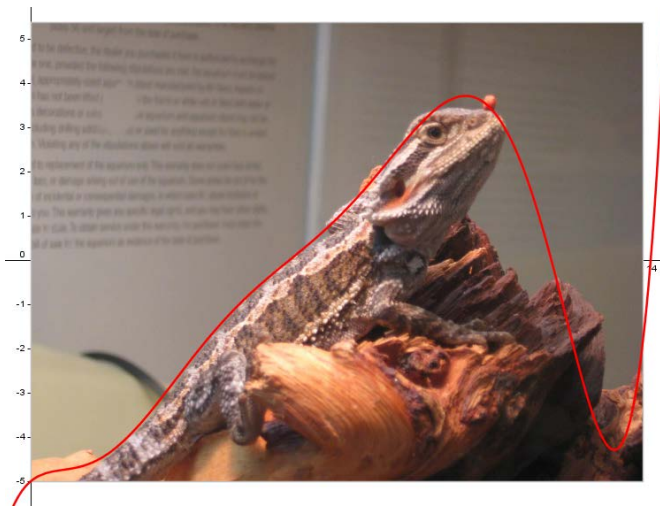
Now that you have a picture and a function, complete the following:

Requirements:

1. What is the equation of your polynomial? What degree is it? Why did you choose that equation? How many points did you ultimately use?
2. Looking only at the part of the function that is in the picture, what is the domain and range?
3. Use your graphing calculator to find the following:
    a. Intervals of increasing/decreasing
    b. x- and y-intercepts
    c. All local extrema
    d. Describe the end behavior
4. Graph your picture <u>by hand</u>. It must be on graph paper or a blank grid.

Tips for a successful project:

- All projects should be typed.
- Use complete sentences. Your explanations are just as important as your mathematics.
- If you cannot print your picture in color, please email it to me – I'd love to see them!
- Have fun!