Predicting the Future of energy Polynomial Functions

Role model Video; Systems Engineer - Joe DeCarolis, NCSU

Keywords: linear Programing, Rational Expressions, Polynomial Functions

Common Core Standards:
N.Q.1
N.Q.2
N.Q.3
N.CN.9
A.APR.1
A.APR.2
A.APR.3
F.IF.1
F.IF.2
F.IF.3
F.IF.4
F.IF.7

Synopsis: The Student will need to analyze the behavior of Polynomial Functions. The video of System engineer deals with the use of practice patterns (algebra Models) of Energy being ran in order to forecast and predict the energy used based on variables. The student will need to use fantom to predict the behavior of function with the change of degrees and coefficients.

Notes: Students should have worked with Fathom some and understand the basic working of the programs and its menus.

Predicting the Future of energy Polynomial Functions

Goal: To predict the future of the polynomial function by changing the degree, and coefficients.

Materials: Paper with polynomial patterns, fantom, pencil

Directions.
1. You are to graph the polynomials functions in fantom.
2. Analyze the graph with each change in degree and coefficient.
3. Note the beginning and the ending of each function with each change.

Polynomial Patterns   Name:

Using fantom , graph the functions below. In the table, record the requested
information for each function.

Polynomial	Even or Odd Degree	Leading coefficient: + or –	Increases or decreases to the left	Increases or Decreases to the right
1. $f(x) = x^4 - 5x^2 + 4$				
2. $f(x) = 3x^6 - x - 11$				
3. $f(x) = 4x^2 + 3x - 3$				
4. $f(x) = 8x^3 - 2x^2 + 7$				
5. $f(x) = 6x^7 - 3x^4 + 5x - 4$				
6. $f(x) = 5x^5 - 3x^3 + 5$				
7. $f(x) = -x^3 + 9x - 3$				
8. $f(x) = -4x^5 + 7x^2 - 3x$				
9. $f(x) = -x^7 - 2x^4 + 5x - 4$				
10. $f(x) = -5x^4 + 2x - 9$				
11. $f(x) = -7x^6 + 4x^3 - x^2$				
12. $f(x) = -x^2 + 8x - 12$				

Answer the questions below based on your results above.

1. Which type of degree increases to the right and left or decreases to the right and left?

2. Which type of degree increases on one side but decreases on the other?
3. What change occurs to the graph when the leading coefficient changes from positive to negative?

Write example functions that meet the following criteria. Analyze the graphs.

4. Decreases on the left and increases on the right.

5. Increases on the left and right.

6. Decreases on the left and right.

7. Increases on the left and decreases on the right.

Open Fathom. Drag a new table down. Add the new attributes: distance and height. ENter in the data for the equation you are working with. Drag down a new graph. Drop the distance attribute on the x-axis and the height attribute on the y-axis. You can use Type in the Function under the Graph menu to plot functions such as the horizontal line for a maximum height or the polynomial equation. To set up your Polynomial function, you will need to drag down one more sliders than the degree. Label them a, b, and c and then plot the function $ax^2 + bx + c$. The sliders should now control the function. Drag the sliders and analyze the graph from the characteristics you have been given.