Families of Graphs

A family is a group of equations with similar characteristics. The following are examples of families of graphs:

<table>
<thead>
<tr>
<th>Linear</th>
<th>Quadratic</th>
<th>Absolute Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Linear Graph" /></td>
<td><img src="image2" alt="Quadratic Graph" /></td>
<td><img src="image3" alt="Absolute Value Graph" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exponential Growth</th>
<th>Exponential Decay</th>
<th>Inverse Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4" alt="Exponential Growth Graph" /></td>
<td><img src="image5" alt="Exponential Decay Graph" /></td>
<td><img src="image6" alt="Inverse Variation Graph" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cubic</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7" alt="Cubic Graph" /></td>
</tr>
</tbody>
</table>

Look at the graphs you sketched on Part one of this activity. Identify each with one of the family names.
Non-Linear and Linear Equations

We can classify equations by the shapes of their graphs. Consider the equations below. Sketch a graph of each equation using the graphing calculators. Group the equations into different “families”, that is groups of equations with similar characteristics.

a. \( y = \frac{3}{x} \)

b. \( y = x + 3 \)

c. \( y = x - 3 \)

d. \( y = 3 - x \)

e. \( y = x^2 + 3 \)

f. \( y = |x + 3| \)

g. \( y = -x \)

h. \( y = |3x| \)

i. \( y = \frac{3}{x} - \frac{4}{x} \)

j. \( y = 2^x \)

k. \( y = \left(\frac{1}{4}\right)^x \)
Function Families Worksheets

1. \( y = 2x^3 \)  

m. \( y = 5^x \)  

n. \( y = -2x^2 - 1 \)  

o. \( y = \left( \frac{2}{5} \right)^x \)  

p. \( y = |x| - 4 \)  

q. \( y = (0.6)^x + 2 \)  

r. \( y = (0.3)x^2 \)  

s. \( y = \frac{-8}{x} \)  

t. \( y = 4x^2 - 3 \)  

u. \( y = 3|x + 2| \)  

v. \( y = (-\frac{1}{2})x^2 - 5 \)