Exploring a New Function

In small groups, you will be exploring a new function over the next few days. The purpose of this exploration is to extend what you understand about linear functions and to make your own mathematical discoveries. Keep track of the characteristics of this new function, using the pattern noticing skills you've been developing during this course.

Task 1: Recall and record key characteristics of linear functions. Be sure to include graphs, equations, descriptions, and their connections.

Task 2: Here is a set of equations, in factored form, representing quadratic functions. Use this list as a starting place, and consider them solid beginning examples. That means your group should be generating more equations to support your exploration.

Examples
  a) $y = x^2$
  b) $y = (x+2)^2$
  c) $y = (x-3)^2$
  d) $y = (x+4)(x-2)$
  e) $y = (x+2)(x+8)$
  f) $y = (x-5)(x-3)$
  g) $y = x^2 + 3$
  h) $y = x^2 - 4$

Extra (Tricky) Examples
  i) $y = 2x^2$
  j) $y = (5x+2)(4x-3)$
  k) $y = 3(x-5)^2 + 4$

Use these equations to begin your exploration, paying attention to ways of representing functions that you used with linear function. The purpose is to understand the relationships between the equations and the graphs, and then more generally with *any* quadratic function in a similar form.

Task 3: Create a poster to show your group's findings to the rest of the class. Use a variety of representations and demonstrate the connections among the representations. The whole group should be ready to explain their findings to the class.