Graphing Piecewise Functions with Feather Boas – Class Handout

Use two pieces of adding machine paper that are each about five feet long in order to create an xy-coordinate system on the floor. Tape it in place. Then use two feather boas to create each of the graphs described below. When you finish creating each graph, sketch the graph and answer the questions.

1. Use feather boas to graph $f(x) = \begin{cases} x+3 & \text{if } x \leq 0 \\ x^2 & \text{if } x > 0. \end{cases}$

   Sketch a copy of your graph.

   (a) How does this graph relate to the individual graphs for $y = x + 3$ and $y = x^2$?

   (b) Why were you given two feather boas? Could this function have been graphed with only one boa? Why or why not?

   (c) Is your graph a function? How can you tell?

2. Use feather boas to graph a function that satisfies all of the following properties:

   $\lim_{x\to\infty} g(x) = 2$
   $\lim_{x\to 0^+} g(x) = -\infty$
   $\lim_{x\to 0^-} g(x) = \infty$
   $\lim_{x\to -\infty} g(x) = 0$

   Sketch a copy of your graph.

   (a) Are there any vertical asymptotes? If so, what are their equation(s)? How are they related to the limits?

   (b) Are there any horizontal asymptotes? If so, what are their equation(s)? How are they related to the limits?

   (c) Why were you given two feather boas? Could the function have been graphed with only one boa? Why or why not?

   (d) Is your graph a function? How can you tell?