Class Drill: Limits Involving Infinity for a Function Given by a Formula

(The instructor will only hand out a copy of this drill to groups of 2 or 3 students.)

The goal is to find limits for $f(x) = \dfrac{-5}{x+3}$ and interpret the results.

You will use the *expanded* definition of limit, in which the concept of *infinity* is used.

(a) The first job is to find $\lim\limits_{x \to -3^-} f(x)$. Notice that part of this symbol is $x \to -3^-$. This tells us that we need to investigate x values that have the following trend:

x is getting closer and closer to -3, but less than -3.

So we build a column of x values that are doing that, and then compute the corresponding y values. Fill out the following table. (Simplify your answers.)

x	$y = \dfrac{-5}{x+3}$
-3.1	$y =$
-3.01	$y =$
-3.001	$y =$

Based on your table, write the result for this limit: $\lim\limits_{x \to -3^-} f(x) =$

(b) Your job now is to find $\lim\limits_{x \to -3^+} f(x)$. Make a table with the appropriate x values, and compute the corresponding y values. Use the back of this sheet of paper for your table.

Based on your table, write the result for this limit: $\lim\limits_{x \to -3^+} f(x) =$

(c) Based on (a) and (b), write the result for this limit: $\lim\limits_{x \to -3} f(x) =$

(d) Explain what (a) and (b) tell you about the graph of $f(x)$.