Name_____ Date_____ Period_____

Worksheet 1.1b—Intro to Continuity and Limits

Show all work on a separate sheet of paper. No Calculator

1. In your own words, what is a discontinuity? How can we spot them graphically? How can we spot them from an equation of a function?

2. What is the difference between a "removable" and a "non-removable" discontinuity?

3. What is the difference between a "point," "jump," and "infinite" discontinuity? Draw a sketch of an example of each, then classify them as "removable" or "non-removable" at the *x*-value of the discontinuity.

4. Using your calculator's numeric table, find the following limits. Remember that only if the limit is the same value from both sides of a specific *x*-value does the ordinary limit exist. If they are different, say "DNE." Also, classify the type of discontinuity at the indicated *x*-value as either "removable" or "non-removable" as well as "point," "jump," or "infinite."

a. $\lim_{x\to 0^-} \frac{x^3+x}{x} =$ b. $\lim_{x\to 0^+} \frac{x^3+x}{x} =$ c. $\lim_{x\to 0} \frac{x^3+x}{x} =$

d. $\lim_{x\to 4^-} \frac{x}{x-2} =$ e. $\lim_{x\to 4^+} \frac{x}{x-2} =$ f. $\lim_{x\to 4} \frac{x}{x-2} =$

g. $\lim_{x\to -3^-} \frac{|2x+6|}{x+3} =$ h. $\lim_{x\to -3^+} \frac{|2x+6|}{x+3} =$ i. $\lim_{x\to -3} \frac{|2x+6|}{x+3} =$

Remember the "abs(" button is found under "MATH" "NUM"

j. $\lim_{x\to -3^-} \left[\ln\left(x^2-9\right)\right] =$ k. $\lim_{x\to -3^+} \left[\ln\left(x^2-9\right)\right] =$ l. $\lim_{x\to -3} \left[\ln\left(x^2-9\right)\right] =$

this is a "natural logarithmic" function. The "ln(" is found to the left of number "4"

5. Using your calculator's numeric table, find the following limits. Remember that if the limit is to be found at a specific *x*-value, you must check from BOTH sides, and only if it is the same value from both sides does the ordinary limit exist. If they are different, say "DNE." Identify and Horizontal Asymptotes.

m. $\lim_{x\to 0} \frac{-6x^3}{\sqrt{4x^6+1}} =$ n. $\lim_{x\to -\infty} \frac{-6x^3}{\sqrt{4x^6+1}} =$ o. $\lim_{x\to \infty} \frac{-6x^3}{\sqrt{4x^6+1}} =$