

Math 1426 Fall 2008 Midterm 1
Rubric for A13

(10 pts) [2.2/34] Use algebraic techniques (that means a table of values and L'Hôpital's

rule cannot be used) to find the limit: $\lim_{x \rightarrow -2} \frac{x+2}{\sqrt{x^2+5}-3}$.

Step 1 (5 pts) $\lim_{x \rightarrow -2} \frac{x+2}{\sqrt{x^2+5}-3} \cdot \frac{\sqrt{x^2+5}+3}{\sqrt{x^2+5}+3} =$

Step 2 (1 pt) $\lim_{x \rightarrow -2} \frac{(x+2) \left[\sqrt{x^2+5}+3 \right]}{x^2+5-9} =$

Step 3 (1pt) $\lim_{x \rightarrow -2} \frac{(x+2) \left[\sqrt{x^2+5}+3 \right]}{x^2-4} =$

Step 4 (1pt) $\lim_{x \rightarrow -2} \frac{(x+2) \left[\sqrt{x^2+5}+3 \right]}{(x+2)(x-2)} =$

Step 5 (1pt) $\lim_{x \rightarrow -2} \frac{\left[\sqrt{x^2+5}+3 \right]}{(x-2)} =$

Step 6 (1pt) $\frac{\sqrt{(-2)^2+5}+3}{-2-2} = \frac{6}{-4} = -\frac{3}{2}$

Grading notes:

- After step 1, it is not necessary that each of the steps be written out explicitly. A student who correctly combines 2 steps will receive full credit for both steps.
- There will be a ½ point deduction for not reducing the final answer.
- There will be a 2 pt deduction for omitting $\lim_{x \rightarrow -2}$ in steps 1-5; just one deduction will be made no matter how times $\lim_{x \rightarrow -2}$ is omitted.
- If step 1 is incorrect, I will award up to 3 pts for a first step that is algebraically correct. For instance, multiplying by $\frac{\sqrt{x^2+5}-3}{\sqrt{x^2+5}-3}$ will receive points while squaring the expression will not receive any credit.
- As indicated by the instructions, no credit will be awarded for a table of values or L'Hôpital's rule.
- No credit will be given for an answer with no supporting work.