

Math 118 Calculus Ia Problems 3 - Limits and Slopes

Name: _____ **Names of tutors/classmates who worked with you:** _____

Write your final draft of your solutions on this sheet. (Use your own paper for scratch work). Each person will turn in one assignment. You are encouraged to discuss your work with your classmates, but each person should write their own solution. You are encouraged to get help from the calculus tutors, but they will want to see that you have completed Skills 4B first. **Due at the beginning of class Friday, October 14.**

(2 points) 0. First, read the “Writing Tips for Limits” (3 pages). I’ll be checking whether you’ve followed the guidelines as I grade the limits on this assignment. Finish the following sentences with an explanation of what you got out of this reading.

From guideline #1, I learned that ...

From guideline #2, I learned that ...

Guideline #3 says that ...

From comments #4 and #5, I learned that ...

(10 points) 1. Evaluate the limits. The correct values for the limits are $1/7$ and $1/6$, respectively. What I’m really interested in seeing is that you can write a clear solution that uses all the mathematical notation correctly to produce those answers.

a. $\lim_{x \rightarrow \sqrt{7}} \frac{x^2 - 7}{x^4 - 7x^2}$

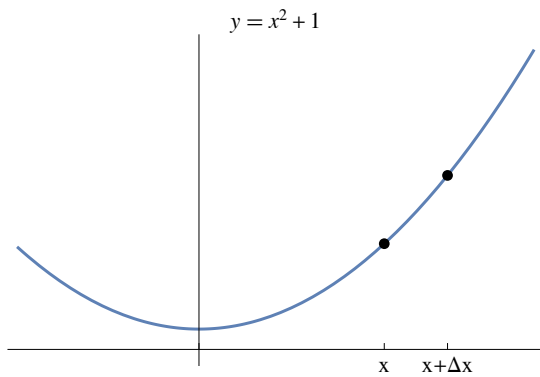
b. $\lim_{x \rightarrow 5} \frac{\sqrt{x+4} - 3}{x - 5}$

(See the opposite side for parts 2 and 3)

(5 points) 2. Evaluate the limit by first expanding the cube, then simplifying the fraction (combining terms and cancelling common factors) until you can evaluate the limit by direct substitution. Since it's Δx that is going to 0, your final answer will be in terms of x , but should not have any Δx 's in it. Follow the writing guidelines here, too.

$$\lim_{\Delta x \rightarrow 0} \frac{(x + \Delta x)^3 - x^3}{\Delta x}$$

(8 points) 3. Referring to the graph below:



a. Express the slope of the line connecting the two points marked on the graph, in terms of x and Δx .

b. Evaluate the limit of that slope (your answer from part *a*) as $\Delta x \rightarrow 0$.
Your final answer will be a simple function in terms of x .