Math 26A **Name (Print):** _____
Fall 2020
DUE BY 3PM ON OCT 21

Instructions:

- The exam is open book and open notes. You may not receive assistance from other people, including through forums or Q&A sites.
- You may use any kind of calculator you like, but you must show each step of your work. *You will receive a zero for correct solutions with no work shown.*
- For incorrect solutions, partial credit will be awarded for work shown.
- You may submit your exam in the same manner as your homework.
- You are welcome to print this exam and write on it directly or to work on a separate piece of paper.
- Round any numeric results to 4 decimal places.

Honesty Statement and Pledge:

I have not given or received any aid or assistance from other students or online question and answer sites for the full duration of the exam. Everything I have written on this exam represents my own work and knowledge. I sign this knowing that infringements on the University's Academic Integrity policy may result in failure or expulsion.

Your submission of this exam serves as your signed agreement to the exam honesty statement and pledge.

1. A high diving competition has a diver jumping from a 66 foot platform with an initial velocity of 6 feet per second.

   (a) (5 points) Assume there is no air resistance. Find the position function for the diver.

   (b) (5 points) Find the diver's velocity.

   (c) (5 points) How high does the diver jump before starting her descent?

(d) (5 points) What is the diver's acceleration at 3 seconds?

(e) (10 points) When our diver hits the water, her velocity changes to $v_0(t) + 7t^2$, where $v_0(t)$ is the velocity you found in (b). Assuming she is diving straight down, how deep must the pool be in order for her to avoid touching the bottom?

2. (30 points) Suppose you want to teach someone how to use the limit definition to find the derivative of

$$f(x) = \frac{1}{x^2 + 2}.$$

To answer this question fully, you must find the derivative using the limit definition, describe each step, and explain each step in a way that would be accessible to someone who is familiar with the Chapter 0 concepts, but has not seen any of the material from Chapters 1 or 2.

3. (30 points) Suppose you want to teach someone how to find the derivative of

$$h(x) = \frac{(x^2+1)\sqrt{3x-2}}{x^3+2}.$$

To answer this question fully, you must find the derivative, describe each step, and explain each step in a way that would be accessible to someone who is familiar with the Chapter 0 concepts, but has not seen any of the material from Chapters 1 or 2.

4. (10 points) Consider your major and/or your career goals. Go online and do some research about how calculus is used in your field. Write at least one paragraph about what you learn.