Section 3.7: The Chain Rule

MATH 130: Calculus I

Due: Monday, March 11, 2019 at 12:20pm Name (Print): _____

After reading Section 3.7 (pages 191-196 in the text), respond to the following questions **on this handout**. Be sure to staple your pages together before turning it in. **You must answer all parts to all questions to earn full credit!!!** See the salmon homework guidelines handout for details. You are encouraged to take additional notes wherever you are keeping your class notes.

Response Section

1. What kind of functions does the Chain Rule help us differentiate?

2. State Theorem 3.13: The Chain Rule.

3. Consider $f(x) = \sin(2x)$.

   (a) Find a $g(x)$ and an $h(x)$ such that $f(x) = (g \circ h)(x)$ and neither of the functions is trivial (that is, none is just x!).

   (b) Try applying the chain rule to find the derivative of f. (Make your best attempt and do not worry if you are wrong.)

   (c) Find a trigonometric formula to rewrite $\sin(2x)$ as a product instead of a composition (check the back of your book!).

   (d) Use the product rule to find the derivative of $f(x) = \sin(2x)$ using that formula. Does your answer match up to what you got when you applied the chain rule? Explain carefully. (Note: they SHOULD match up. You may need to use another trigonometric formula to make it look like they do.)

4. The function $k(x) = \sec^5(4x^3 - 12)$ is the composition of THREE functions. Find $f(x)$, $g(x)$ and $h(x)$ such that $k(x) = f(g(h(x)))$ and none of the functions is trivial (that is, none is just x!). Show your work clearly. (Note: I am not asking you to differentiate this yet!)

5. Look at the proof of the chain rule on pages 190-191. Write down the first few steps of the proof, up until and including the "fancy one" and the reorganizing after multiplying by it!

Questions/Exercise Section

6. Write down at least two questions you have on the reading. OR if you have NO questions, do exercise 38 in Section 3.7 (page 197). Be sure to show all steps for full credit! See the salmon homework guidelines handout for details.

Reflection Section

7. Write **two or three** sentences reflecting on the progress of your recent work in the course. See the salmon homework guidelines handout for details.

Time Section

8. How much time did you spend on this reading assignment? _____