Reading Assignment # 5

Math 13 - Prof. Orellana

January 14, 2009

Read Sections 2.5

1. Read Theorem 5.1, what assumption do they mean when they say the "preceding assumptions"? By the way what does the theorem says?
2. According to the paragraph after equation (2) why is there an "abuse of notation"?
3. In page 140, the paragraph that starts "The formulas ... " tells you in words what the chain rule says, what does it say?
4. At the beginning of the section entitled "The Chain Rule in Several Variables" what do they mean by C^1 function? If you don't remember look in the index under C^k and look up the definition.
5. Give me an example of a function $\mathbf{x} : T \subseteq \mathbb{R} \to \mathbb{R}^2$ that is differentiable, vector valued and it depends on a single variable t.
6. What is $f \circ \mathbf{x}$?
7. According to Proposition 5.2 what is the derivative of $f \circ \mathbf{x}$ at t_0? Read the paragraph after Proposition 5.2 and tell me why there are partial derivatives and ordinary derivatives in this formula?
8. Write the general formula for the chain rule using vectors and matrix derivatives.
9. If we think of $f : X \subset \mathbb{R}^3 \to \mathbb{R}$ as a temperature function and $\mathbf{x} : T \subseteq \mathbb{R}^2 \to \mathbb{R}^3$ as a surface, what would $f \circ \mathbf{x}$ represent? What are the formulas for $\frac{\partial f}{\partial s}$ and $\frac{\partial f}{\partial t}$?
10. Theorem 5.3 gives the general form of the chain rule, state it.