

Mathematical Self-Reflection Study Questions

When covering a new topic:

- What was the "point" of the last two weeks? The video from last night?
- What seems like the most important thing to remember?
- What are you still struggling with?
- What suggestions do you have for yourself or the class for focus/study/success?
- How are inflection points like relative extrema? How are they different?
- How are these two optimization problems similar? How are they different?
- After watching the solution to this problem, what would be the steps you could write down for yourself to repeat the process on other problems?

When studying for the test—Business Calculus Examples

1. What is a second derivative? What does it measure? How do I find it? What are the "units" like for second derivative values?
2. What is elasticity of demand? What does it measure/approximate? How do I find it?
3. What do the words "elastic", "inelastic", and "unitary" mean? How are they different in terms of their impact on revenue?
4. What is increasing/decreasing? What do they "look like"? How do I find where a function is increasing/decreasing?
5. What is concave up/concave down? What do they "look like"? How do I find where a function is concave up/concave down?
6. What is marginal revenue (or marginal cost, marginal profit)? What does it approximate? How do I find it? How is it related to the point of diminishing returns?
7. What is a relative maximum/ relative minimum? What does it "look like" on a graph or in a (first derivative) sign chart? How do I locate it (x value) and find it (y value)? How do I use the Second Derivative Test to do this?
8. What is an inflection point? What do inflection points "look like" on a graph? on a graph or in a (second derivative) sign chart? How do I find them (as points (x,y))?
9. What do inflection points "mean" in applied problems? How can I see that on a graph?
10. What is a point of diminishing returns? How do I find it? How does it relate to f' ? How does it relate to f'' ?
11. What are the steps for making a sign chart for f' ? What are the steps for making a sign chart for f'' ? How do I use them differently?
12. How do points where the tangent is horizontal, or where the function is not differentiable, "show up" in the process for making a sign chart?
13. What is the hardest part of this for me that I most need to practice/remember? Have I written that down somewhere so that I can look at it frequently before the exam?

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Note: This list is made up of questions I have used in my mathematics classes. The ideas are not entirely my own; suggestions for such question types can be found in teacher resources all over, including the work of Linda Nilsson, whose keynote at the DU Teaching and Learning Conference inspired me to collect the questions I've been using.