See also Prof. Mortensen's official review sheet on the course website.

1. (2.8, 34) Find the derivative of $f(x) = \sqrt{2 + \tan^{-1}(x)}$.
2. State the Mean Value Theorem.
3. (Ch2 Review Ex 1) True or False: if a function is continuous at $x = a$, then it has a tangent line at $x = a$.
4. (2.9 12) Determine where $f(x) = x^4 + 2x^2 + 1$ is increasing and decreasing.
5. (3.1 3) Find the linear approximation to $f(x) = \sqrt{2x + 9}$ at $x_0 = 0$.
6. (3.1 23) Use Newton's method with the given x_0 to compute x_1 and x_2 by hand: $x^4 - 3x^2 + 1 = 0$, $x_0 = 1$.
7. (3.2 28) Evaluate $\lim_{x \to 0^+} \dfrac{\sin(x)}{\sqrt{x}}$.
8. (3.3 51) Give an example showing that the following statement is false (not always true): between any two local minima of $f(x)$ there is a local maximum.
9. (3.3 36) Find the absolute extrema of $f(x) = x^2 e^{-4x}$ on each indicated interval: (a) $[-2, 0]$, (b) $[0, 4]$.
10. (3.5 26) Determine all critical points, local extrema, and inflection points of $f(x) = \frac{\sqrt{x}}{1+\sqrt{x}}$.
11. (3.7 4) A three-sided fence is to be built next to a straight section of river, which forms the fourth side of a rectangular region. There is 96 feet of fencing available. Find the maximum enclosed area and the dimensions of the corresponding enclosure.