

Math 265A: Test # 4 REVIEW

Review problems: Page 246: 2, 5, 10, 17, 19, 37, 41, 53, 55, 69, 70 (ans: L'Hopital's Rule does apply, the limit is π), 71, 79, 80. Also, review problems done for homework, 4.1, #29, 31

Answer for #2: critical points are $x=2$, $x=4$; $x=2$ locates a local min which is also a global min; $x=4$ locates neither a max nor a min (local or global); the global max is located at the endpoint, $x = 5$.

Note: If a problem asks for the critical point (or any other number) as an "exact value", this means that the answer should be given as, say, $x = \sqrt{2}$, not as an approximation, $x \approx 1.4$

Graphing (non-CAS) calculators will be allowed on this exam.

1. Graphical analysis, using calculus.

Given a function, determine the following:

- the critical points of f (remember that critical points are found where the derivative is zero OR undefined)
- the intervals on which f is increasing or decreasing.
- the location (x -value) of any local max's or min's and the actual max/min value (y -value). Justify your answers by constructing a sign chart.
- the intervals on which f is concave up or concave down. Justify your answers by constructing a sign chart.
- Also be able to give the coordinates of any local max's or min's and points of inflection. Be able to give coordinates using EXACT values.

Be able to create a graph from given sign charts for the first and second derivative.

Solve puzzle/critical thinking problems involving these concepts (see #37, for example).

2. Determine the **global max and min** of f on a closed interval $[a,b]$

3. Identify, set up and solve **related rates** problems.

4. Identify, set up and solve application problems involving **optimization**.

L'Hopital's Rule: Be able to identify a limit that is in indeterminate form (either $\frac{0}{0}$ or $\frac{\infty}{\infty}$) and use L'Hopital's Rule to evaluate the limit, if it exists.