

### Review sheet for quiz 3

The quiz will cover §11.7, 11.8, and 12.1. Here is a list of topics that will be emphasized, some topics in the text that will NOT be on the quiz, and some suggested practice problems.

§11.7-Maximum and minimum values. You should know:

- The definition of local maximum and local minimum of a function  $f(x, y)$ .
- The definition of the absolute maximum and absolute minimum of a function  $f(x, y)$  on a domain  $D$ .
- That a continuous function on a closed and bounded domain has an absolute maximum and an absolute minimum.
- What a critical point  $(a, b)$  of a function  $f$  is:  $\nabla f(a, b) = 0$ , and the relation of the critical points to the local maxima and minima.
- How to find the absolute maximum and minimum of a function on a domain.
- The second derivative test for local maxima, local minima and saddle points.

Practice problems: pg. 809-10 #1, 3, 5, 7, 9, 25, 27, 29.

§11.8-Lagrange multipliers You should know:

- What problem the method of Lagrange multipliers solves: To find candidates for the absolute maximum and absolute minimum of a function  $f$  subject to a constraint  $g = k$ .
- The Lagrange multiplier equation:  $\nabla f = \lambda \nabla g$ , and how to use this equation, together with the constraint equation  $g = k$  to find a list of candidates for the maximum and minimum of  $f$  on  $g = k$ .
- How to use Lagrange multipliers to handle the boundary part of the problem of finding the absolute maximum and absolute minimum of a function  $f$  on a domain  $D$ .
- How to use Lagrange multipliers for functions of 3 variables

You will not need to know about Lagrange multipliers with two constraints.

Practice problems: pg. 818-19 #3, 5, 7, 9, 11, 19, 25

§12.1. Double integrals over rectangles. You should know

- What is a Riemann sum for a function of 1 variable on an interval  $[a, b]$  and for a function of two variables on a rectangle  $R$ .
- The definition of  $\iint_R f(x, y) dA$  as a limit of Riemann sums.
- How to use a Riemann sum to approximate  $\iint_R f(x, y) dA$ , when  $f$  is given as a formula, as a table of values or as a contour diagram.
- The relation of  $\iint_R f(x, y) dA$  to the volume of the solid between the graph of  $f$  and the rectangle  $R$ .
- The average value of a function  $f(x, y)$  on a rectangle  $R$ .

You will not need to know about the midpoint rule.

Practice problems: pg. 836-37 #1, 11, 13, 17, 25

Additional practice problems: pg. 822 # 15, 17, 19. pg. 823, true-false quiz #7. pg. 825 #51, 55, 59, 61. pg. 899 exercises # 1.