

MAC 2313 FINAL EXAM STUDY GUIDE

- 1.) Gradient and directional derivative. (Reference: Examples 1–3 on pages 931–936; Questions 1 and 2 on Quiz 8.)
- 2.) Find an equation of the tangent plane to a surface at the given point. (Reference: Examples 1–3 on pages 943–946; Question 3 on Quiz 8.)
- 3.) (i) Find critical points of a function $f(x, y)$. (ii) Use the second derivative test to classify the critical points. (Reference: Examples 1 and 3 on pages 954–956; Question 4 on Quiz 8.)
- 4.) Given a (double) iterated integral, sketch the corresponding region of integration, interchange the order of integration (from $dx dy$ to $dy dx$, or from $dy dx$ to $dx dy$), and calculate the new integral. (Reference: Exercises 49–52 on page 999; Question 5 on Quiz 8; Question 1 on Quiz 9.)
- 5.) Use polar coordinates to set up and evaluate a double integral. (Reference: Example 2 on page 1003; Homework for Section 14.3 and Question 1 on Quiz 10.)
- 6.) Use polar coordinates to set up and evaluate a double integral for the area of a region \mathcal{R} in the plane. (Reference: Question 2 on Quiz 10; Exercises 37, 38 and 39 on page 1007.)
- 7.) Using xyz -coordinates, set up and calculate a triple integral for the volume of a given solid. You should be able to sketch the solid, so review sketching basic surfaces. (Reference: Example 4 on page 1028; Questions 5 and 6 on Quiz 10; Handout on sketching basic surfaces.)
- 8.) Using cylindrical coordinates, set up and calculate a triple integral for the volume of a given solid. You should be able to sketch the solid. (Reference: Homework for Section 14.7 (part1) from the book and the handout given in class; Questions 7 and 8 on Quiz 10; Handout on sketching basic surfaces.)
- 9.) Using spherical coordinates, set up and calculate a triple integral for the volume of a given solid. You should be able to sketch the solid. (Reference: Example 4 on page 1039; Homework for Section 14.7 (part 2) from the book and the handout given in class; Handout on sketching basic surfaces.)