Math 2934 (Honors) — Fall 2015
Review for final exam

The final exam will be comprehensive, covering, in addition to the material on the first three exams, sections 16.5, 16.6, and 16.7, covered on Assignment 13. When reviewing for the final you can use the review sheets for the first three exams to see what sections of the text the exam will be over. Below is a list of what topics to review from sections 16.5 through 16.7.

16.5. Curl and divergence. Review the entire section. You should memorize the definition of the curl of a vector field (the easiest way is to remember its representation as the determinant of a three-by-three matrix, as in Example 1) and the definition of the divergence of a vector field.

16.6. Parametric surfaces and their areas. Review from the beginning of the section through Example 9. Especially important are examples 4, 5, 6, 7, and 9.

If you wish, you can skip the remaining material on surface area (pages 1128–1131), because I won't ask questions on the final about finding the surface area of parametrically defined surfaces. (But remember that surface area of surfaces given by $z = f(x, y)$ was a topic that we covered earlier, in section 15.6, and might appear.) But you might want to look at the material on surface area in this section, anyway, just to improve your understanding of the meaning of the vector $\mathbf{r}_u \times \mathbf{r}_v$. Be careful not to confuse the integral in the box on page 1129 with the surface integral of a vector field defined in section 16.7. The integral in the box on page 1129 involves the magnitude of the vector $\mathbf{r}_u \times \mathbf{r}_v$. When computing the surface integral of a vector field, on the other hand, you take the dot product of the vector field with $\mathbf{r}_u \times \mathbf{r}_v$; you do not take the magnitude of this vector.

16.7. Surface integrals. There are two kinds of surface integrals defined in this section. The first is defined in the box on page 1135, and the second, which is called the "surface integral of a vector field", is defined in the box numbered 9 on page 1141. In this class, we have only talked about the second kind, and it is the only one you need to know about for the final exam. So in reviewing this section, you can start on page 1139 with the subsection titled "Oriented surfaces", and read through Example 5 on pages 1142–1143. You do not need to read the material which follows example 5.

Actually, in class, we did not cover the formula for surface integrals which appears in the box numbered 10 on page 1142, but I noticed that a lot of you used this formula to do the surface integral in question 2 on Quiz 7, either because you read about it yourself or learned about it from Ore. This formula in box 10 is convenient when it applies, but remember that it only applies to surfaces that are given by an equation of the form $z = f(x, y)$. The formula in box 9 on page 1141 is more general, and can be applied to any surface that you can give in parametric form.