MA 242 Section 1 – Test 4 – Review

This review sheet contains questions that are similar to what I will ask on the test. The actual test will have fewer questions.

(1) 6.2.1: 11,15

(2) This question has multiple parts.

- Determine whether or not F and G (defined below) are conservative. For those that are conservative, find a potential function.

$F = \langle xyz, sinxy, e^{z^2} \rangle \qquad G = \langle -3x^2 - yz - 2x + z, -xz - 1, xy + x \rangle.$

- Let C be the quarter circle of radius 2 in the $z = 1$ plane centered at $(0, 0, 1)$. Compute each of the following line integrals. Use the potential function from the previous part, if it exists.

$$\int_C F \cdot d\mathbf{r} \qquad \int_C G \cdot d\mathbf{r}.$$

(3) 6.5.5: 5,7,9,11,17,21,23,31,33,35

(4) 7.2.4: 15, 17, 19

(5) 7.3.3: Positively oriented means counterclockwise, and Green's theorem for circulation is just Green's theorem. 13, 15

(6) 7.4.1: 1,7,9,13(tricky). Note that the book's notation for surface integrals over vector fields is a tiny bit different than ours (they write $\iint_S \vec{F} \cdot \hat{n}\ dS$ whereas we write $\iint_S \vec{F} \cdot d\mathbf{S}$).

(7) 7.5.1: 7,9,11 (all surfaces oriented outward)

(8) 7.5.1: 21

(9) You may find pages 85 and 86 in chapter 7 helpful. Note their notation for curl(F) is $\nabla \times F$.

(10) 7.6.1: 1,3,5,7