Math-215 Calculus III Analytic Geometry

Please box your answers for each of the exercises below. Also, be mindful of your presentation, I will deduct 10 points for disorganized or unintelligible answers.

Exercises 96/100 (12 points each)

1) Section 13.2, problem # 3.

2) Section 13.2, problem # 17.

3) Section 13.2, problem # 18.

Let the C be the unit square in the xy-plane on the first quadrant with one vertex on the origin going from $(0,0)$ to $(1,0)$ to $(1,1)$ to $(0,1)$ to $(0,0)$.

4) Compute the work done by $\vec{F} = \langle x, y \rangle$ along C; can you tell whether $\vec{F}$ is conservative based on what we have discussed during lecture? Explain.

5) Compute the work done by $\vec{F} = \langle y, x \rangle$ along C; can you tell whether $\vec{F}$ is conservative based on what we have discussed during lecture? Explain.

6) Compute the work done by $\vec{F} = \langle xy, x \rangle$ along C; can you tell whether $\vec{F}$ is conservative based on what we have discussed during lecture? Explain.

7) Graph an estimate of $\vec{F}$ at $(0,0)$, $(1,0)$, $(1,1)$, $(0,1)$, and $(0,0)$ **for each non-conservative** $\vec{F}$ above; can you tell why $\vec{F}$ is non conservative based on these plots? Explain in words.

8) Calculate $\int_C \vec{F} \cdot \mathrm{d}\vec{r}$ for $\vec{F} = \langle x, y \rangle$ where C is the top half-circle from $(-4,0)$ to $(4,0)$; hint: plot $\vec{F}$ along C on at least three different points.

More difficult problems 4/100 (2 points each). *Please submit these on a separate sheet*.

In the exercises below calculate $\int_C \vec{F} \cdot \mathrm{d}\vec{r}$

9) $\vec{F} = \langle x^2 + 1, y^3 - 3y + 2 \rangle$, C is the top half-circle from $(-4,0)$ to $(4,0)$.

10) $\vec{F} = \langle 3x^2 y + 1, 3xy^2 \rangle$, C is the bottom half-circle from $(1,0)$ to $(-1,0)$.