Math 001D Assignment 16.4 Ans_____

Instructions: Write complete legible solutions to the following problems in the space provided. Be sure to supply all the necessary steps that lead to your answers

1. Evaluate the line integral by the two following methods.

$$\int_C (x-y)dx+(x+y)dy$$

C is counterclockwise around the circle with center the origin and radius 5

a. directly Ans_____

b. using Green's Theorem Ans_____

2. Use Green's Theorem to evaluate the line integral along the given positively oriented curve.

$$\int_C \left(5y+9e^x\right)dx+\left(10x+7\cos\ y^2\right)dy$$ Ans_____

C is the boundary of the region enclosed by the parabolas $y=x^2$ and $x=y^2$

3. A particle starts at the point (–2, 0), moves along the x-axis to (2, 0), and then along the semicircle $y = \sqrt{4 - x^2}$ to the starting point. Use Green's Theorem to find the work done on this particle by the force field $\mathbf{F}(x, y) = \langle 4x, x^3 + 3xy^2 \rangle$

Ans_____

4. Evaluate line integral $\oint_C \mathbf{F} \cdot d\mathbf{r}$ where C is any positively oriented simple closed curve that encloses the origin by using a circle of radius r, and r is small enough so that the circle lies entirely inside C given

$$\mathbf{F}(x, y) = \frac{2xy\mathbf{i} + (y^2 - x^2)\mathbf{j}}{(x^2 + y^2)^2}$$

Ans_____

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