Lecture 28 Worksheet

July 22, 2021

1. Calculate $\oint_C 2y\,dx$, where C is positively oriented triangular curve with vertices (0,0), (3,0), and (5,4).

2. Let $\mathbf{F}(x,y) = \left\langle \ln(1+x^2) + x^2\sin(y), \frac{x^3}{3}\cos(y) + e^{\cos(y)} \right\rangle$ and C be the closed positively oriented curve $x^2 + y^2 = 10$.

   (a) Is $\mathbf{F}$ conservative?

   (b) $\oint_C \mathbf{F} \cdot d\mathbf{r} =$

3. Let D be the region bounded by $y = x^2$ and $y = x + 2$, and let C be the boundary curve of D oriented positively.

   (a) Use Green's Theorem to set up the following integral $\oint_C e^x\,dx + 2xy\,dy = \int_a^b \int_c^d f(x,y)\,dy\,dx$

   (b) Evaluate.