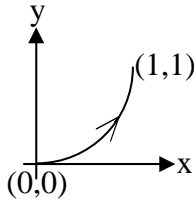


HOMEWORK #2 (Chapter 9 Vector Calculus)

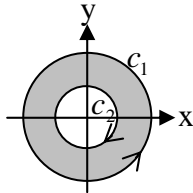
- (1). In this problem, find the work done by the force $F(x, y) = (2x + e^{-y})\mathbf{i} + (4y - xe^{-y})\mathbf{j}$ along the indicated curve. (Exercises 9.9 problem 17).



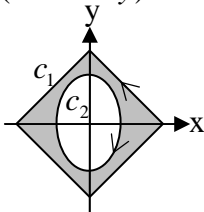
- (2). The inverse square law of gravitational attraction between two masses m_1 and m_2 is given by $F = \frac{-Gm_1m_2\mathbf{r}}{\|\mathbf{r}\|^3}$, where $\mathbf{r} = x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$. Show the F is conservative. Find a potential function for F . (Exercises 9.9 problem 27).

In problem (3) and (4), evaluate the given line integral where $c = c_1 \cup c_2$ is the boundary of the shaded region R .

- (3). $\oint_c (4x^2 - y^3)dx + (x^3 + y^2)dy$. $c_1: x^2 + y^2 = 4, c_2: x^2 + y^2 = 1$ (Exercises 9.9 problem 23).



- (4). $\oint_c (\cos x^2 - y)dx + (\sqrt{y^3 + 1})dy$. $c_2: 4x^2 + y^2 = 16$ (Exercises 9.9 problem 24)



- (5). Find the work done by the force $F = -y\mathbf{i} + x\mathbf{j}$ acting along the cardioid $r = 1 + \cos\theta$.

(Exercises 9.9 problem 33)

