공업수학 2: Homework #3

Due to: 2021-10-08 (금)

1. Evaluate $\int_C \boldsymbol{F}(\boldsymbol{r}) \cdot d\boldsymbol{r}$, where $\boldsymbol{F}(x, y, z) = (x^2 + y^2, x^2 - y^2)$ and C is the boundary of the region $R: 1 \leq y \leq 2 - x^2$.

2. Evaluate the integral, $\iint_S (x + y + z) dA$, where $S: z = x + 2y, 0 \leq x < \pi, 0 \leq y \leq x$.

3. $\boldsymbol{F}(x, y, z) = (xy^2, x^2y, 6 \sin x)$ 이고, S가 cone $z = \sqrt{x^2 + y^2}$과 평면 $z = 2$, $z = 4$로 정의되는 surface 일 때, divergence theorem을 사용하여 $\iint_S \boldsymbol{F} \cdot \boldsymbol{n} dA$ 값을 구하시오.