Assignment 2

Due on 2020-10-15, 10:00 AM

1. Using the Divergence Theorem, evaluate the value of $\iint_\Omega \mathbf{F} \cdot d\mathbf{S}$ for the function $\mathbf{F} = (x^2-y^2, y^2-z^2, z^2-x^2)$ over the region enclosed by the three planes $x=0$, $y=0$, and $z=0$.

2. Using the Divergence Theorem, evaluate the value of the line integral $\int_C \mathbf{F} \cdot d\mathbf{r}$ around the boundary of the region defined by $x^2 + y^2 = 1$ and $z = 0$.

3. Find the surface area of the portion of the sphere $x^2 + y^2 + z^2 = 4$ inside the region bounded by the planes $x = 1$, $y = 0$, and $z = 0$.

4. Evaluate the integral $\iiint_\Omega \mathbf{F} \cdot d\mathbf{V}$ for the function $\mathbf{F} = (x^2, y^2, z^2)$ and the region bounded by the planes $x = 0$, $y = 0$, and $z = 0$.

5. The value of $\iiint_\Omega \mathbf{F} \cdot d\mathbf{V}$ for the function $\mathbf{F} = (x, y, z)$ and the region bounded by the planes $x = 0$, $y = 0$, and $z = 0$.

6. Using Stokes' Theorem, evaluate the value of $\int_C \mathbf{F} \cdot d\mathbf{r}$ along the curve $C$ formed by the intersection of the planes $x = 0$, $y = 0$, and $z = 0$.

7. Using Stokes' Theorem, evaluate the value of $\int_C \mathbf{F} \cdot d\mathbf{r}$ along the curve $C$ formed by the boundary of the region defined by $x^2 + y^2 = 1$ and $z = 0$.

8. The value of the line integral $\int_C \mathbf{F} \cdot d\mathbf{r}$ for the function $\mathbf{F} = (x^2, y^2, z^2)$ along the curve $C$ defined by the intersection of the planes $x = 0$, $y = 0$, and $z = 0$.

9. Using Green's Theorem, evaluate the value of the line integral $\int_C \mathbf{F} \cdot d\mathbf{r}$ for the function $\mathbf{F} = (x, y, z)$ along the curve $C$ defined by the boundary of the region defined by $x^2 + y^2 = 1$ and $z = 0$.

10. Using Green's Theorem, evaluate the value of the line integral $\int_C \mathbf{F} \cdot d\mathbf{r}$ for the function $\mathbf{F} = (x, y, z)$ along the curve $C$ defined by the boundary of the region defined by $x^2 + y^2 = 1$ and $z = 0$.

11. Using Divergence Theorem, evaluate the value of $\iiint_\Omega \mathbf{F} \cdot d\mathbf{V}$ for the function $\mathbf{F} = (x^2, y^2, z^2)$ and the region bounded by the planes $x = 0$, $y = 0$, and $z = 0$.

12. Using Divergence Theorem, evaluate the value of $\iiint_\Omega \mathbf{F} \cdot d\mathbf{V}$ for the function $\mathbf{F} = (x^2, y^2, z^2)$ and the region bounded by the planes $x = 0$, $y = 0$, and $z = 0$.