

$$1) \vec{F} = \langle xz, \frac{1}{2}y^2 + x, xz \rangle$$

FIND $\text{DIV} \vec{F}$

$$2) \vec{F} = \langle xy, -yz, xz \rangle$$

FIND $\text{CURL} \vec{F}$

3) LET C BE THE CIRCLE $x^2 + y^2 = 1$ WITH COUNTER CLOCKWISE DIRECTION.

LET $f(x, y) = xy$ SO $\vec{\nabla} f = \langle y, x \rangle$

FIND $\oint_C y dx + x dy$

4) LET $\vec{F} = \langle z, y, x \rangle$ A VECTOR FIELD IN $\mathbb{R}^3$. LET C BE THE CURVE GIVEN

BY $\vec{r}(t) = \langle \cos t, \sin t, 2 \rangle$ $0 \leq t \leq 2\pi$

FIND $\oint_C \vec{F} \cdot d\vec{r}$

5) LET $\vec{F} = \langle y+z, x^2z, \sqrt{xy} \rangle$

LET S^2 BE THE SPHERE $x^2 + y^2 + z^2 = 1$

FIND $\iint_S \vec{F} \cdot d\vec{S}$

6) LET C BE THE CURVE $x = y^4$ FROM $(1, -1)$ TO $(1, 1)$.

FIND $\int_C \sin x dx$

7) C IS THE CIRCLE $x^2 + y^2 = 1$

FIND $\int_C -y dx + x dy$

8) C IS THE CURVE GIVEN BY

$\vec{r}(t) = \langle t, t^2, t^3 \rangle$ $0 \leq t \leq 1$

$\vec{F} = \langle yz, xz, xy \rangle$

FIND $\int_C \vec{F} \cdot d\vec{r}$