

Homework Assignment #2

(due Aug. 26, 2022, at beginning of class)

1. Find the gradients of the following functions:

(a) $f(x, y, z) = x^3 + y^2 + z^5$

(b) $f(x, y, z) = x^3 y^2 z^5$

(c) $f(x, y, z) = \sin(x) \ln(y) e^z$

2. Griffiths 1.13

3. Calculate the divergence of the following vector functions

(a) $\mathbf{v}_a = y^2 \hat{\mathbf{x}} + (2xy + z^2) \hat{\mathbf{y}} + 2yz \hat{\mathbf{z}}$

(b) $\mathbf{v}_b = -xy \hat{\mathbf{x}} + 2yz \hat{\mathbf{y}} + 7xz \hat{\mathbf{z}}$

(c) $\mathbf{v}_c = x^2 \hat{\mathbf{x}} + 3xz^2 \hat{\mathbf{y}} - 2xz \hat{\mathbf{z}}$

4. Calculate the curls of the following vector functions (same as in previous question)

(a) $\mathbf{v}_a = y^2 \hat{\mathbf{x}} + (2xy + z^2) \hat{\mathbf{y}} + 2yz \hat{\mathbf{z}}$

(b) $\mathbf{v}_b = -xy \hat{\mathbf{x}} + 2yz \hat{\mathbf{y}} + 7xz \hat{\mathbf{z}}$

(c) $\mathbf{v}_c = x^2 \hat{\mathbf{x}} + 3xz^2 \hat{\mathbf{y}} - 2xz \hat{\mathbf{z}}$