Unit 2 - Week 1

Assignment 1

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-02-12, 23:59 IST.

Vector calculus: Gradient

Let $\vec{R}$ be the separation vector from a fixed point (x', y', z') to the fixed point (x, y, z) and R be its length.

1) Choose the correct statements from the following: ***2 points***

- $\vec{\nabla}(R^2) = 2\vec{R}$
- $\vec{\nabla}(R^2) = \vec{R}$
- $\vec{\nabla}(R^2) = 2\hat{R}$
- $\vec{\nabla}(R^2) = 2\hat{R}/R$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\vec{\nabla}(R^2) = 2\vec{R}$

2) Choose the correct statements from the following: ***2 points***

- $\vec{\nabla}\left(\frac{1}{R}\right) = -\frac{\hat{R}}{R^3}$
- $\vec{\nabla}\left(\frac{1}{R}\right) = -2\frac{\hat{R}}{R^2}$
- $\vec{\nabla}\left(\frac{1}{R}\right) = \frac{\hat{R}}{R}$
- $\vec{\nabla}\left(\frac{1}{R}\right) = -\frac{\hat{R}}{R^2}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\vec{\nabla}\left(\frac{1}{R}\right) = -\frac{\hat{R}}{R^2}$

3) The general formula for $\vec{\nabla}(R^n)$ is ***2 points***

- $n\,R^{n-1}\,\vec{R}$
- $n\,R^{n-1}\,\hat{R}$
- $n\,R^{n/2}\,\hat{R}$
- $(n-1)\,R^{n-1}\,\vec{R}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$n\,R^{n-1}\,\hat{R}$

Divergence and curl

For two vectors given as

$$\vec{v}_a = x^2\hat{x} + 3xz^2\hat{y} - 2xz\hat{z}$$

and

$$\vec{v}_b = xy\hat{x} + 2yz\hat{y} + 3zx\hat{z}$$

4) evaluate the divergence and curl to identify the correct statements from the following: ***5 points***

- $\vec{\nabla}.\vec{v}_a = 0$
- $\vec{\nabla}\times\vec{v}_a = 0$
- $\vec{\nabla}.\vec{v}_a = 5x$
- $\vec{\nabla}\times\vec{v}_a = -2y\hat{x} - 3z\hat{y} - x\hat{z}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\vec{\nabla}.\vec{v}_a = 0$

5) evaluate the divergence and curl to identify the correct statements from the following: ***4 points***

- $\vec{\nabla}.\vec{v}_b = 0$
- $\vec{\nabla}\times\vec{v}_b = 0$
- $\vec{\nabla}.\vec{v}_b = 5x$
- $\vec{\nabla}\times\vec{v}_b = -2y\hat{x} - 3z\hat{y} - x\hat{z}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\vec{\nabla}\times\vec{v}_b = -2y\hat{x} - 3z\hat{y} - x\hat{z}$