- Relaciones vectoriales que deberíamos saber deducir

1. $\vec{\nabla}\,(\mathbf{A}\cdot\mathbf{B}) = \mathbf{B}\times(\vec{\nabla}\times\mathbf{A}) + \mathbf{A}\times(\vec{\nabla}\times\mathbf{B}) + (\mathbf{B}\cdot\vec{\nabla})\mathbf{A} + (\mathbf{A}\cdot\vec{\nabla})\mathbf{B}$

2. $\vec{\nabla}\cdot(\mathbf{A}+\mathbf{B}) = \vec{\nabla}\cdot\mathbf{A} + \vec{\nabla}\cdot\mathbf{B}$

3. $\vec{\nabla}\cdot(\mu\mathbf{A}) = \mathbf{A}\cdot\vec{\nabla}\,\mu + \mu\vec{\nabla}\cdot\mathbf{A}$

4. $\vec{\nabla}\cdot(\mathbf{A}\times\mathbf{B}) = \mathbf{B}\vec{\nabla}\times\mathbf{A} - \mathbf{A}\vec{\nabla}\times\mathbf{B}$

5. $\vec{\nabla}\times(\mathbf{A}+\mathbf{B}) = \vec{\nabla}\times\mathbf{A} + \vec{\nabla}\times\mathbf{B}$

6. $\vec{\nabla}\times(\mu\mathbf{A}) = (\vec{\nabla}\,\mu)\times\mathbf{A} + \mu(\vec{\nabla}\times\mathbf{A})$

7. $\vec{\nabla}\times(\mathbf{A}\times\mathbf{B}) = (\vec{\nabla}\cdot\mathbf{B})\mathbf{A} - (\vec{\nabla}\cdot\mathbf{A})\mathbf{B} + (\mathbf{B}\cdot\vec{\nabla})\mathbf{A} - (\mathbf{A}\cdot\vec{\nabla})\mathbf{B}$

8. $\vec{\nabla}\times(\vec{\nabla}\times\mathbf{A}) = \vec{\nabla}\,(\vec{\nabla}\cdot\mathbf{A}) - (\vec{\nabla}^2\,\mathbf{A})$

donde

9. $$(\mathbf{A}\cdot\vec{\nabla})\mathbf{B} = \hat{x}(A_x\frac{\partial B_x}{\partial x} + A_y\frac{\partial B_x}{\partial y} + A_z\frac{\partial B_x}{\partial z}) +$$
$$\hat{y}(A_x\frac{\partial B_y}{\partial x} + A_y\frac{\partial B_y}{\partial y} + A_z\frac{\partial B_y}{\partial z}) +$$
$$\hat{z}(A_x\frac{\partial B_z}{\partial x} + A_y\frac{\partial B_z}{\partial y} + A_z\frac{\partial B_z}{\partial z})$$

y

10. $\vec{\nabla}\,R = -\vec{\nabla}'\,R = \frac{\vec{R}}{R} = \hat{R}$

11. $\vec{\nabla}\,(R^n) = -\vec{\nabla}'\,R^n = nR^{n-1}\hat{R}$

12. $\vec{\nabla}\,(\frac{1}{R}) = -\vec{\nabla}'(\frac{1}{R}) = -\frac{\hat{R}}{R^2} = -\frac{\vec{R}}{R^3}$

13. $\vec{\nabla}^{2}(\frac{1}{R}) = -(\frac{3}{R^3}) + (\frac{3R^2}{R^5}) = 0 \qquad (R\neq 0)$

14. $\vec{\nabla} \cdot (\frac{\vec{R}}{R^3}) = 0$ y $\vec{\nabla}' \cdot (\frac{\vec{R}}{R^3}) = 0$ $(R \neq 0)$