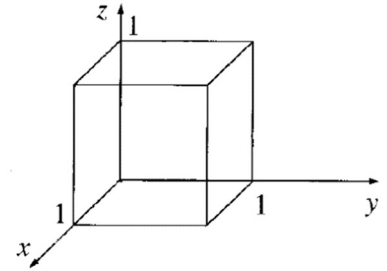


Q1.

Check the divergence theorem using the function

$$\vec{v} = 2z^2 \hat{x} + (4y^2 + x) \hat{y} + 6xz \hat{z}$$

and the unit cube situated at the origin as in the figure below.

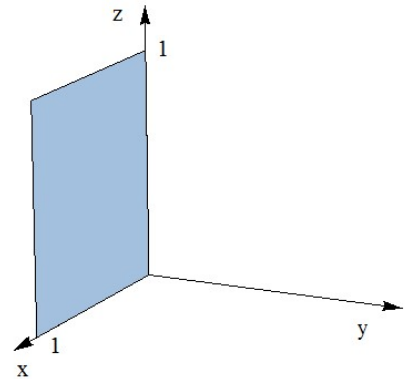


Q2.

Check the curl theorem using the function

$$\vec{v} = (3yz + 5x^2) \hat{x} + 2x^2z \hat{z}$$

and the square shown in the figure below.



Q3.

A. Using the spherical coordinate, compute the gradient and the Laplacian of

$$T = r(\sin \theta + 2 \cos \theta \sin \phi).$$

B. Test the gradient theorem of this function, using the path shown in the figure from the Cartesian coordinates $(0, 2, 0)$ to $(0, 0, 0)$.

