

## Step-1

We have to fill in the following blanks.

Suppose  $\mathbf{L}$  is a one dimensional subspace (a line)  $\mathbf{R}^3$ . Its orthogonal complement  $\mathbf{L}^\perp$  is the \_\_\_\_\_ perpendicular to  $\mathbf{L}$ . Then  $(\mathbf{L}^\perp)^\perp$  is a \_\_\_\_\_ perpendicular to  $\mathbf{L}^\perp$ . In fact  $(\mathbf{L}^\perp)^\perp$  is the same as \_\_\_\_\_.

## Step-2

Suppose  $\mathbf{L}$  is a one dimensional subspace (a line)  $\mathbf{R}^3$ . Its orthogonal complement  $\mathbf{L}^\perp$  is the two- dimensional subspace (a plane) in  $R^3$  perpendicular to  $\mathbf{L}$ . then  $(\mathbf{L}^\perp)^\perp$  is a one-dimensional subspace (a line) perpendicular to  $\mathbf{L}^\perp$ . In fact  $(\mathbf{L}^\perp)^\perp$  is the same as  $\mathbf{L}$ .