

## Problem 1.4

### *Direction cosines*

The direction cosines of a vector are the cosines of the angles it makes with the coordinate axes. The cosines of the angles between the vector and the  $x$ ,  $y$ , and  $z$  axes are usually called, in turn,  $\alpha$ ,  $\beta$ , and  $\gamma$ . Prove that  $\alpha^2 + \beta^2 + \gamma^2 = 1$ , using either geometry or vector algebra.