

### Answer on Question #48917, Physics, Other

Can a vector have a component equal to zero and still have a nonzero magnitude?

**Solution:**

Yes, a vector can have nonzero magnitude if one of its three component is nonzero e.g.  $2\hat{i} + 3\hat{j} + 0\hat{k}$  or  $2\hat{i} + 0\hat{j} + 0\hat{k}$ .

If  $\mathbf{r} = (x, y, z)$  represents the vector, the length, or magnitude,  $r = |\mathbf{r}|$  is

$$r = \sqrt{x^2 + y^2 + z^2}$$

The vector  $\mathbf{r} = (2, 3, 0)$  have magnitude

$$r = \sqrt{2^2 + 3^2 + 0^2} = \sqrt{13}$$

**Answer:** Yes.