

Check your understanding

21. If a space curve $\mathbf{r}(t)$ satisfies the equation

$$\mathbf{r}'(t) \times \mathbf{r}''(t) = 0$$

for all t , what does this mean geometrically?

- (a) The curve is a constant.
- (b) The curve moves along a line.
- (c) The curve moves directly toward or away from the origin.
- (d) None of the above.

Answer: (b)

Explanation: If $\mathbf{r}'(t) \times \mathbf{r}''(t) = 0$, then the derivative of $\mathbf{r}'(t)$ is parallel to $\mathbf{r}'(t)$, so the velocity vector $\mathbf{r}'(t)$ does not change direction.