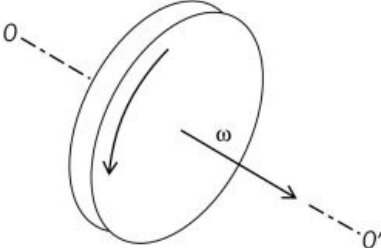Clicker Questions on Curves

1. To prove that the derivative of a unit vector $\vec{u}$ is perpendicular to itself...

   a) take the derivative of $\vec{u} \cdot \vec{u}$ and argue from there

   b) take the derivative of $\vec{u} \times \vec{u}$ and argue from there

   c) both of the above

   d) none of the above

2. Which of the following represents $-\kappa T + \tau B$?

   a) N

   b) B'

   c) N'

   d) T'

   e) none of the above

3. Why is N perpendicular to T?

   a) Because N is parallel to $\vec{k}$, and $\vec{k}$ is the derivative of the unit vector T and hence perpendicular to it

   b) Because $N = B \times T$

   c) both of the above

   d) It isn't perpendicular

   e) It is perpendicular but not by any of the above

4. In the following image, if a coaster car is traveling for a bit on a coaster shaped like the following, following the path of the arrow,

   a) the people in the coaster would feel the curvature of the curve as a tilt, dip or even flip upside down

   b) the people in the coaster would feel the curvature pulling them sideways

   c) both of the above

   d) none of the above

1. a
2. c
3. c
4. a