Go to the website: Visualizing the Dot Product in Higher Dimensions and play with the simulation for a few minutes. Then answer the following questions:

1. From the algebraic definition of the dot product

$$\vec{v} \cdot \vec{w} = v_1 w_1 + v_2 w_2 + \cdots = \sum_i v_i w_i$$

   how can you tell when two vectors are perpendicular?

2. Set the components v_1, w_1, v_2, w_2 all to different non-zero numbers. Now find values for the other components so that $\vec{v} \cdot \vec{w} = 0$. How many ways are there to do this?