For all steps below you should follow the simplest strategy that makes use of relationships discussed in class. You should not need to execute strategies that involve the inversion of matrices (except matrices that are very easy to invert).

Consider a frame $B$ whose origin is given as $[10 -5 0]^T$ with respect to frame $A$. Frame $B$ is rotated by 45° with respect to the $z$-axis of frame $A$. Complete the following steps:

1. Determine $A_B^R$.

2. Given $A_P = [10 5 0]^T$, compute $B_P$. You should draw both frames and point $P$ to illustrate their relationship. This sketch should also allow you to confirm your answer graphically.

3. Give the unit quaternion that describes the rotation of frame $B$ with respect to $A$.

4. Take the unit quaternion from the previous step and apply it to rotate vector $V = [0 1 0]^T$. You should be able to predict the result of this operation.