Instructions: Work together to solve the following. Assuming you are working well together you will not be graded on whether you complete the groupwork but rather on how well you do on the problems that you complete.

1. For each of the following calculate the corresponding $3 \times 3$ matrix.
   (a) Rotate by 5.25 radians counterclockwise about $(56, 102)$.

   (b) Reflect in the line $y = x + 1$.

2. (a) Consider a point on the line $y = 2x + 1$ in $\mathbb{R}^2$. Which point in $E^2$ does this correspond to? As $x \to \infty$ which point at infinity does this go to? How about as $x \to -\infty$?

   (b) Repeat the previous question with a point on the line $y = 2x + 7$.

   (c) What does this suggest about the two lines?
3. Suppose an object starts at the origin and travels with constant velocity $\alpha$ down and to the right along the line $y = -x$. From the perspective of a viewer at $z = 10$ what happens to the object in terms of location and speed as $t \to \infty$?