1. Two lines in $\mathbb{R}^2$ are perpendicular if and only if their slopes $t_1$ and $t_2$ satisfy $t_1 t_2 = -1$, or one is vertical and the other is horizontal. Use this to show that the line from $(1, 0)$ to $(3, 4)$ is perpendicular to the line from $(0, 2)$ to $(4, 0)$.

2. Consider the vertical line through the point $(2, 0)$. Write the equation for this line in two different ways. (Hint: there is the standard $Ax + By + C = 0$, but you can also use vectors)

3. Find the orbit of the point $(1, 1)$, under the transformation $r_\pi$. 