1. What is the converse of this statement: “If pigs had wings, they could fly.”? Is the converse true? Why or why not?

2. Define a relation, $\prec$, between pairs of real numbers: $(a, b) \prec (c, d)$ if $a < c$ and $b < d$. Prove that $\prec$ is transitive.

3. René-Jules wants to design a necklace of 17 beads made from coral (red) or ivory (white), arranged so that adjacent beads are different colors. Prove that he will not succeed.

4. Prove that $\sum_{i=1}^{n} (2i - 1) = n^2$ for integers $n \geq 0$. 