Sample problems

simple: Show, with proof, how to dissect a square into at most five pieces in such a way that the pieces can be reassembled to form three squares no two of which have the same area.

medium: Find the final five digits of the number

$$9^{(9^{\cdot^{\cdot^{(9^{(9^9)})}}\cdot\cdot})}$$

for 1001 9's.

hard: Show that any group with more than two elements admits an automorphism other than the identity automorphism.