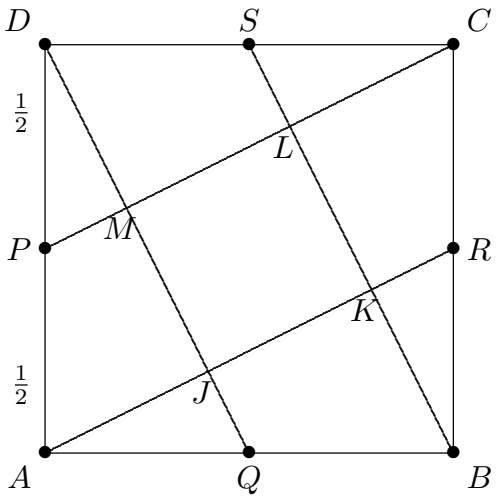
MthT 491 Geometric Proportional Reasoning

From **Math Olympics - Rome**, March 21, 1997:

1. (Revisited) In the unit square $ABCD$ the points P, Q, R, S are the midpoints of the sides. What is the ratio between the area of the smaller square $JKLM$ and the area of the square $ABCD$?



2. (A general problem) In the unit square $ABCD$ the points P, Q, R, S on the sides are such that the proportions $AP : AD :: DS : DC :: CR : CB :: BQ : BA :: \alpha : 1$. What is the ratio between the area of the square $JKLM$ and the area of the square $ABCD$?