Quiz #5. Math 360, Axiomatic Geometry. Name: ____________________
Instructor: Ramin Naimi Fri 8 Nov 2002

Closed book. Closed Notes. May only use the Definitions-Axioms-Theorems handout, with no writings on it. 20 points per problem. Please write very legibly.

Please do not write in this area.	1.	2.	3.

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1. Prove that any two distinct great circles on a sphere always intersect in two opposite points. (Assume that they intersect in two points; just prove that the points are opposite points).

2. Suppose an isometry of the Euclidean plane sends every point on the y-axis to some point on the x-axis. What are all possibilities for the image of the line $y = x$ under this isometry? More precisely, if the image is given by the equation $y = mx + b$, what are all possible values for m and b? Support your answer. (Rigorous proof not required; just give a convincing argument that you haven't missed any possibilities.)

3. Prove Theorem 4.3: If A, B, C are not colinear points, and if S is an isometry, then $S(A)$, $S(B)$, $S(C)$ are not colinear.