

**MATH 301/501 HOMEWORK 5—DUE AT THE BEGINNING OF CLASS ON
THURSDAY, OCTOBER 29**

One goal for this course is for you to develop your skill in effectively communicating mathematics. With this in mind, you should clearly write up your solutions. A solution with little or no justification will receive little or no credit.

- (1) Prove that a reflection is an isometry. We proved this in class for a single case.
- (2) Let ℓ_1 and ℓ_2 denote two parallel lines. Prove that the composition of reflections $r_{\ell_2} \circ r_{\ell_1}$ results in a translation through a distance twice the distance between the lines, in a direction perpendicular to the lines, in the direction from ℓ_1 to ℓ_2 . We proved one case of this in class.
- (3) Determine whether the operation of composition of isometries is commutative. Prove your result.