

RIGID MOTIONS OF THE PLANE

LECTURE 1, EXERCISE SET 1

Definition 1. A *rigid motion* of the plane (or an *isometry*) is a motion which preserves distance.

There are four basic rigid motions:

- (1) Reflection
- (2) Glide Reflection
- (3) Rotation
- (4) Translation

Theorem 2. *The above list contains all rigid motions of the plane.*

Exercise 3. Describe compositions of the following motions as one of the motions from the list above.

- (1) Rotation by the angle α counter clockwise around the origin followed by rotation by the angle β counter clockwise around the origin.
- (2) Translation by the vector (a, b) followed by translation by the vector (c, d) .
- (3) Reflection through a line l_1 followed by reflection through a line l_2 .
- (4) Translation by $(1, 1)$ followed by rotation by 90° counter clockwise around the origin.
- (5) Rotation by 90° counter clockwise around the origin followed by translation by $(1, 1)$.
- (6) Rotation by 90° counter clockwise around the origin followed by rotation by 90° clockwise around the point with coordinates $(2, 0)$.