

MATH 521B: Abstract Algebra
Homework 2: Due Feb. 2

For each of the following five shapes in \mathbb{R}^2 :

- a. Name every isometry (without writing explicitly).
- b. Classify each isometry as identity or rotation (which angle?) or reflection in a line (which line?).
- c. For every pair of isometries f, g , determine the composed isometry $g \circ f$. It should be on your list! Make a table.
- d. For every pair of isometries f, g , determine whether or not they commute (i.e. $g \circ f = f \circ g$).

1. A is a scalene triangle.
2. B is an isosceles (but not equilateral) triangle.
3. C is an equilateral triangle.
4. D is a rectangle (but not a square).
5. E is a square.

6. Find a finite shape F in \mathbb{R}^3 and an isometry of F that is NOT an identity, rotation, reflection, or inversion. Hint: improper rotation.