

Math 338 Final Review Game

A. **Transformations of the Plane** For each map below decide which of the following properties it has:

- a) preserves Euclidean distance
 - b) preserves Taxicab distance
 - c) preserves angles
1. The reflection over the line $y = 2x$.
 2. The dilation of the plane with center $(0,0)$ and scaling factor 2.
 3. The reflection over the line $y = -x$.
 4. The rotation of the plane around center $(0,0)$ by 90° .
 5. The circle inversion about the unit circle with center $(0,0)$.

Solutions:

1. preserves Euclidean distance and angles
2. Preserves angles
3. Preserves Euclidean distance, Taxicab distance, and angles
4. Preserves Euclidean distance, Taxicab distance, and angles
5. Preserves angles

B. **Triangle Congruence** Decide whether the following statements are true or false.

1. If $ABCD$ is a parallelogram, then $\triangle ABC$ and $\triangle BCD$ are congruent.
2. If $ABCD$ is a parallelogram, then $\triangle ABC$ and $\triangle CDA$ are congruent.
3. If $ABCD$ is a parallelogram, then $\triangle ABC$ and $\triangle ADC$ are congruent.
4. If $ABCD$ is a rhombus, then $\triangle ABC$ and $\triangle ADC$ are congruent.
5. If $ABCD$ is a rectangle, then $\triangle ABC$ and $\triangle ADC$ are congruent.

Solutions:

1. False
2. True
3. False
4. True
5. False

C. Congruence and Similarity For each of the following, state if it is a:

- a) triangle congruence theorem
- b) triangle similarity theorem
- c) both
- d) neither

- 1. SSS
- 2. SAS
- 3. AA
- 4. AAS
- 5. SSA

Solutions:

- 1. both
- 2. both
- 3. triangle similarity theorem
- 4. triangle congruence theorem but also implies similarity
- 5. neither

D. **What Am I an Axiom For?** State which set of axioms the following statement comes from.

1. There exists a unique ray that is the angle bisector of $\angle ABC$.
2. If A , B , and C are three points with B between A and C , then AC is equal to $AB + BC$.
3. Suppose that the region R is the union of two regions R_1 and R_2 . Suppose also that R_1 and R_2 intersect in at most a finite numbers of segments and points. Then the area of R is the sum of the areas of R_1 and R_2 .
4. A circle can be drawn, given a center and a radius.

Solutions:

1. angle measure
2. line segment measure
3. area
4. one of Euclid's five axioms