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Exam Two , MTH 211, Spring 2010

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QUESTION 1. Below is a Frieze pattern. State all the symmetries involved in the pattern.

QUESTION 2. Let D be a rectangle 6×3. We want to remove the line segments that connect the vertices of D and replace them with SOMETHING you select but no line segments are allowed in order to use many pieces of the new object to tile a plane. DRAW ONE IMAGE of the new object that you selected.

QUESTION 3. We want to tile a plane using pieces of regular 8-gon and pieces of another regular n-gon. STATE ALL POSSIBILITIES of the other regular n-gon. JUSTIFY YOUR ANSWER. If V is a vertex of one piece of a regular 8-gon, How many pieces of regular 8-gon and how many pieces of the other regular n-gon share the vertex V

QUESTION 4. Define the concept of similarity of a plane.

Define the concept of Central similarity of a plane.

Let $f : R^2 \to R^2$ be a CENTRAL similarity of the plane R^2. Given if D is a square in the plane with perimeter equals to 16 cm, then after applying f on D we get a square $D\prime$ (i.e. $f(D) = D\prime$) that has a perimeter equals to 4cm.

a) Let M be a 12×8 rectangle in the plane. Find the length and the width of $M\prime = f(M)$ (i.e. Find the length and the width of the new rectangle $M\prime$ after applying f on M)

b) Let $z = (-4, 20)$ find f((-4, 20)).

QUESTION 5. Construct a line segment ab of length 3cm. Now construct a circle C with radius 5 such that C passes through a and b. If Inv(ab) with respect to C is a line segment, then find the exact length of the line segment Inv(A)inv(B). If Inv(ab) with respect to C is an arc, then DRAW THE EXACT ARC that equals to Inv(ab).

QUESTION 6. Draw the inversion of D with respect to the circle C.

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