

History of Mathematical Ideas

Quiz 12

Name: _____

You have 10 minutes to complete this quiz. If you have a question raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**. Show your work, and give adequate explanations.

1. Show, or explain, why there exist infinitely many congruent nonoverlapping triangles in the hyperbolic plane. (Hint: Explain how one can start with one triangle and generate infinitely many congruent nonoverlapping copies.)

Start at some point A_0 on the x -axis and mark off other points A_1, A_2, \dots in the positive x -direction such that $\overline{A_0A_1} = \overline{A_1A_2} = \overline{A_2A_3} = \dots = 1$. Draw an H -line ℓ_i perpendicular to the x -axis at A_i for each i . Let T_1 be any triangle between ℓ_0 and ℓ_1 . Now reflect T_1 through ℓ_1 to create a congruent triangle T_2 that lies between ℓ_1 and ℓ_2 . Continue reflecting successively through ℓ_2, ℓ_3, \dots and creating congruent reflected images T_3, T_4, \dots with each T_{i+1} between ℓ_i and ℓ_{i+1} .