

Fundamental Group Sorter

MATH 596 Topics in Algebra and Knots

Name: _____

Directions: The **fundamental group** $\pi_1(X)$ of a topological space X is the group of homotopy equivalence classes of based loops in X , with the operation of concatenation. Considering each of the capital letters of the English alphabet and numerals 0–9 as subsets of the plane, classify them according to their fundamental groups.

A B C D E F G H I

J K L M N O P Q

R S T U V W X Y Z

0 1 2 3 4 5 6 7 8 9 0

Letters/numbers with
fundamental group

$\pi_1(X) =$ _____

Letters/numbers with
fundamental group

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fundamental group

$\pi_1(X) =$ _____

Then:

- Find a letter or numeral from a non-English alphabet whose fundamental group is *different* than the above. What is $\pi_1(X)$ for this character?
- Suppose X is made of two disconnected characters, such as $X = \mathbf{10}$. What becomes of $\pi_1(X)$? Why?