

Beauty of Mathematics Pset #3

1. Write down all of the elements of the symmetric group on 3 letters. How many are there?
2. Write down all of the elements of the braid group on 3 strands. How many are there?
3. Can you give a matching between the two sets? If you can't, explain why. Is there anything similar about these two groups?
4. Prove that the set of rotations on a square is a group. That is, show:
 - i. The set contains an identity element (a “do nothing” element).
 - ii. Every element of the group has an inverse (an element that reverses each rotation)
 - iii. Show that composing rotations is associative.
 - iv. Show that the set is closed under the operation of rotation. (For any rotation you do, you'll still have a square.)