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Algebra 1

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Problems:

- 1. (20 pt) Let G be a group acting on a set X.
 - (a) If |G| = 11 and |X| = 12 prove that the action has at least one fixed point.
 - (b) If |G| = 11 and |X| = 10 prove that G(x) = x for all $x \in X$.

2. (30 pt)

- (a) Prove that $\{(124), (142), (1)\}$ is a subgroup of S_4 .
- (b) Prove that $\{(124), (142), (1)\}$ is not a normal subgroup of S_4 .
- (c) Describe all elements of order 4 in S_4 .