The number of all transformation
groups on an infinite set*

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Let X be an infinite set, $T(X) = \{f \in X^X : f$ is a bijection$\}$, $C = \{G : G$ is a transformation group on $X\} = \{G : G$ is a subgroup of $T(X)\}$. Then $|C| = 2^{2^{|X|}}$. In proof of this result, the AC is used.

References

[1] Kuratowski K., and Mostowski, A., Set theory, 1976, p. 296—300.

[2] Yang An-zhou, Cardinal numbers of some sets (I), (III), Kexue Tongbao (Bull. of science), Vol. 27. (1982), No. 12., No. 18., p. 765., p. 1150.