

15. TRUE or FALSE. (If true, PROVE it. If false, give a COUNTER EXAMPLE.)
All groups of order 6 are isomorphic.

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False A_6 and S_3 are groups of order 6 but they are not isomorphic because A_6 is abelian and S_3 is not abelian.

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16. TRUE or FALSE. (If true, PROVE it. If false, give a COUNTER EXAMPLE.)
All groups of order 7 are isomorphic.

True All groups of order 7 are cyclic and hence isomorphic to Z_7 .

Lagrange's theorem says that if G is a group of order 7 and $g \in G$ with $g \neq e$ then $1 < |\langle g \rangle| \mid 7$, thus $\langle g \rangle = G$.

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