Exercise 10.40

Abstract Algebra 1
MATH 3140

SEBASTIAN CASALAINA

ABSTRACT. This is Exercise 10.40 from Fraleigh [Fra03, §10]:

Exercise 10.40. Let G be a finite group of order n with identity e. Show that for any $a \in G$, we have $a^n = e$.

Solution. Let G be a finite group of order n with identity e, let $a \in G$, and let $r = |a|$ be the order of a. From [Fra03, Theorem 10.12, p.101], we know that r divides n; in other words, $n = rs$ for some natural number s. From this we have $a^n = a^{rs} = (a^r)^s = e^s = e$. □

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REFERENCES

[Fra03] John Fraleigh, *A First Course in Abstract Algebra*, Seventh edition, Addison Wesley, Pearson, 2003.

UNIVERSITY OF COLORADO, DEPARTMENT OF MATHEMATICS, CAMPUS BOX 395, BOULDER, CO 80309

Email address: casa@math.colorado.edu