LAGRANGE'S THEOREM – ANSWER

Definition: If H is a subgroup of a finite group G, then the number of right (left) cosets of H in G is called the index of H in G and is denoted by $[G:H]$.

Theorem: If H is a subgroup of a finite group G, then the number of right (left) cosets of H in G, denoted by $[G:H]$, is equal to $\frac{|G|}{|H|}$.

Proof: By previous proof, if $|G| = n$ and $|H| = m$, then $n = mk$ where k is the number of distinct right (left) cosets of H in G. Therefore, $[G:H] = k = \frac{n}{m} = \frac{|G|}{|H|}$.

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