

Math 317 Section B1 Quiz 6 (with solutions)

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Problem 1.

Let $G = S_5$ and let $H = \langle \sigma \rangle$ where $\sigma = (1435)$.

Find the index of H in G . Justify your answer.

Solution.

Since σ is a 4-cycle, it has order 4 in S_n . Hence the order of the cyclic group H is also equal to 4. Therefore by Lagrange's theorem:

$$[G : H] = \frac{|G|}{|H|} = \frac{5!}{4} = \frac{120}{4} = 30.$$