

Name _____

Quiz #9
Mathematics 309a Abstract Algebra
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Using cycle notation, the 24 elements of S_4 are

$\{ \iota, (12), (13), (14), (23), (24), (34),$
 $(123), (132), (124), (142), (134), (143), (234), (243),$
 $(1234), (13)(24), (1432), (1324), (12)(34), (1423), (1243), (14)(23), (1342) \} .$

1. Circle the 12 elements of A_4 :

$\{ \iota, (12), (13), (14), (23), (24), (34),$
 $(123), (132), (124), (142), (134), (143), (234), (243),$
 $(1234), (13)(24), (1432), (1324), (12)(34), (1423), (1243), (14)(23), (1342) \} .$

2. A_4 has _____ cosets in S_4 .

3. $H = \{ \iota, (12)(34), (13)(24), (14)(23) \}$ is a subgroup of S_4 . It has _____ cosets in S_4 .

4. Since H has 4 elements, it must be either V , or Z_4 . Which one is it? _____

5. $H(12)(34) = \{ \text{_____} \}$

6. $K = \{ \iota, (123), (132) \} = \langle (123) \rangle$ is a subgroup of S_4 . It has _____ cosets in S_4 .

7. $K(123) = \{ \text{_____} \}$

8. $K(12) = \{ \text{_____} \}$

9. $(12)K = \{ \text{_____} \}$