4.25 Figure

■ EXERCISES 4

Computation

In Exercises 1 through 5, compute the indicated product involving the following permutations in S_6:

$$\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 1 & 4 & 5 & 6 & 2 \end{pmatrix}, \qquad \tau = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 4 & 1 & 3 & 6 & 5 \end{pmatrix}, \qquad \mu = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 5 & 2 & 4 & 3 & 1 & 6 \end{pmatrix}.$$

1. $\tau\sigma$ **2.** $\tau^2\sigma$ **3.** $\mu\sigma^2$ **4.** $\sigma^{-2}\tau$ **5.** $\sigma^{-1}\tau\sigma$

In Exercises 6 through 9, compute the expressions shown for the permutations σ, τ, and μ defined prior to Exercise 1.

6. σ^6 **7.** μ^2 **8.** σ^{100} **9.** μ^{100}

10. Convert the permutations σ, τ, and μ defined prior to Exercise 1 to disjoint cycle notation.

11. Convert the following permutations in S_8 from disjoint cycle notation to two-row notation.

    a. $(1, 4, 5)(2, 3)$

    b. $(1, 8, 5)(2, 6, 7, 3, 4)$

    c. $(1, 2, 3)(4, 5)(6, 7, 8)$

12. Compute the permutation products.

    a. $(1, 5, 2, 4)(1, 5, 2, 3)$

    b. $(1, 5, 3)(1, 2, 3, 4, 5, 6)(1, 5, 3)^{-1}$

    c. $[(1, 6, 7, 2)^2(4, 5, 2, 6)^{-1}(1, 7, 3)]^{-1}$

    d. $(1, 6)(1, 5)(1, 4)(1, 3)(1, 2)$

13. Compute the following elements of D_{12}. Write your answer in standard form.

    a. $\mu\rho^2\mu\rho^8$

    b. $\mu\rho^{10}\mu\rho^{-1}$

    c. $\rho\mu\rho^{-1}$

    d. $(\mu\rho^3\mu^{-1}\rho^{-1})^{-1}$