

NAME (printed neatly) _____ QUIZ#10 GRADE _____

Directions for taking quizzes: the same as in the previous quizzes.

1. (a) Find the number of inversions in the permutation $\pi = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 3 & 2 & 4 & 7 & 6 & 1 & 5 \end{pmatrix}$;
- (b) Let $A = (a_{ij})$ be a 7×7 matrix. Determine with what sign does the term $a_{13}a_{22}a_{34}a_{47}a_{56}a_{61}a_{75}$ appear in the expansion of the determinant of A
2. Let π is the permutation of 9 symbols such that $\pi = (125)(3578)(149)(24569)$
Find the signature of π .

1 (a) Inversions of π are
 $(3,2), (3,1), (2,1), (4,1), (7,1), (7,5), (6,1), (6,5)$
 # of inversions = $\boxed{9}$

(b) since # of inversion is odd then $\text{sgn}(\pi) = -1 \Rightarrow$
 the sign of the given term in the determinant is $\boxed{-1}$

2. $\pi = \underbrace{(125)}_{\tau_1} \underbrace{(3578)}_{\tau_2} \underbrace{(149)}_{\tau_3} \underbrace{(24569)}_{\tau_4}$, $\text{length}(\tau_1) = 3, \text{length}(\tau_2) = 4,$
 $\text{length}(\tau_3) = 3, \text{length}(\tau_4) = 5$
 $\text{sgn}(\pi) = \text{sgn}(\tau_1) \text{sgn}(\tau_2) \text{sgn}(\tau_3) \text{sgn}(\tau_4) = (-1)^2 (-1)^2 (-1)^3 (-1)^4 = \boxed{-1}$

-you can continue your solution in the next page, if you do not have enough space