

Quiz #6

Name: _____

1) Let $X = \{1, 2, \dots, 13, 14\}$.

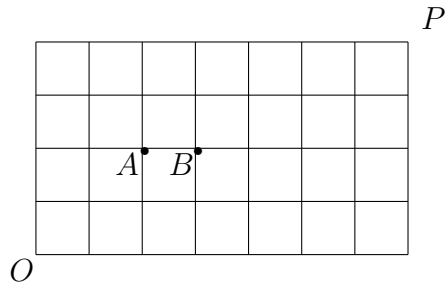
- (a) Find the number of 2-combinations of X . Simplify your answer as much as possible. (1 point)
- (b) Find the number of 5-combinations of X that do not contain a pair of consecutive integers. Write your answer as a binomial coefficient. (1 point)

2) Find the number of 13-digit binary sequences with nine 0's and four 1's such that no two 1's are adjacent. (2 points)

3) (a) Let $X = \{\{1\}, y\}$. Find all elements of $\mathcal{P}(X)$ (the power set of X). (1 point)

(b) If Y is a set with 6 elements, how many elements are in $\mathcal{P}(Y)$? (1 point)

4) Find the number of shortest routes from O to P that pass through the street AB . (2 points)



5) Suppose that k and n are positive integers with $3 \leq k \leq n$ and that $a_1, \dots, a_n, b_1, \dots, b_n$ are $2n$ distinct elements. Form the n pairs $\{a_1, b_1\}, \{a_2, b_2\}, \dots, \{a_n, b_n\}$.

(a) Find the number of subsets of $\{a_1, \dots, a_n, b_1, \dots, b_n\}$ of size k that do not contain two elements from the same pair. (1 point)

(b) Find the number of subsets of $\{a_1, \dots, a_n, b_1, \dots, b_n\}$ of size k that contain exactly one of the pairs. (1 point)