

Quiz #3

Give a solution for each problem. No explanation needed, as full credit will be given for the right answer.

Please *do not simplify* your result, because it will make it harder to grade, and you might make an algebra mistake and end up losing points.

Consider a set $X = \{x_1, x_2, \dots, x_n\}$ with $n \geq 4$. Express your answers as a function of n .

1. How many subsets of X are there?
2. How many non-empty subsets of X are there?
3. How many subsets of X have cardinality at most 3?
4. How many subsets of X have cardinality at least 4?
5. How many subsets are there that do not include x_1 ?
6. How many subsets are there of size 3 that do not include x_1 ?
7. Solve this using the Inclusion-Exclusion Principle: How many subsets are there that have at least one of x_1, x_2 or x_3 ?
8. How many ways can you form a line with these elements?
9. How many ways can you form a line with these elements, if the line begins with x_1 and then x_2 , in that order?
10. How many ways can you form a line with these elements, if the line begins with x_1 and x_2 in some order?