

Answer on Question #38168 - Math – Set Theory

Question: Let S be a set of n elements. The number of ordered pairs in the largest and the smallest equivalence relations on S are:

- a) n and n
- b) n^2 and n
- c) n^2 and 0
- d) n and 1

Solution. The largest equivalence relation on S is a relation that contains all pairs (x, y) , where x and y are elements of S . The number of such (ordered) pairs is $n * n = n^2$.

The smallest equivalence relation on S is such a relation that every element x of S is only equivalent to itself. Thus, this relation will have n ordered pairs.

Note that any equivalence relation must be reflexive (i.e. each element must be equivalent to itself), so we cannot have 0 or 1 pair in this case.

Answer. b) The number of ordered pairs in the largest and the smallest equivalence relations on S are n^2 and n .