The important issue is the logic you used to arrive at your answer.

1. On the set \( \mathbb{Z}^+ \) of positive integers, consider the division relation
   \( D = \{ (x, y) : x \text{ evenly divides } y \} \). Prove that \( D \) is a partial order on \( \mathbb{Z}^+ \).

2. Prove or disprove (with a simple counterexample): the division relation on \( \mathbb{Z}^+ \) is a total order.

3. Given a non-empty set \( A \), on its power set \( P(A) \) consider the subset relation
   \( S = \{ (x, y) : x \subseteq y \} \). Prove that \( S \) is a partial order on \( P(A) \).
4. Prove or disprove (with a simple counterexample): For all non-empty sets \( A \), the subset relation on \( P(A) \) is a total order.

5. On the set \( \mathbb{Z} \times \mathbb{Z} \) of ordered pairs of integers, consider the lexicographical (or “dictionary”) ordering relation
\[
LE = \{((x, y), (w, z)) : (x \leq w) \land (x = w) \Rightarrow (y \leq z)\}.
\]
Prove that \( LE \) is a partial order on \( \mathbb{Z} \times \mathbb{Z} \). (Note: Be very careful here. Since \( \mathbb{Z} \times \mathbb{Z} \) has ordered pairs as elements, \( LE \) has pairs of pairs as elements.)

6. Prove or disprove (with a simple counterexample): the lexicographical ordering relation on \( \mathbb{Z} \times \mathbb{Z} \) is a total order.