Proof Notebook Problem 5

The Problems:

1. Let R be a relation on some set S. Show that R is symmetric if and only if R^c is symmetric.
2. Let P be a partition on a set S. Explain how to construct an equivalence relation R from P and then prove that R is an equivalence relation.
3. Let S be the set of monomials in the variables x and y. Construct a total ordering of S such that every subset $A \subseteq S$ has a smallest element. Prove that S is totally ordered and provide an informal explanation for why every subset has a smallest element.
4. Let R be a symmetric and reflexive relation on some set S. Show that the transitive closure of R is an equivalence relation.

Please do not do multiple problems: you should have a clear mind for the peer review and proof workshop.
Only use the forth problem if you're in a group of four.

Due Dates:

Item	Due Date	Method
Draft 1	Friday, October 31 (10pm)	Blackboard
Peer Review 1	Before 2nd draft	On your own – nothing to turn in
Draft 2	Tuesday, November 4	In class
Draft 3	Friday, November 7 (10pm)	Blackboard
Second Proof Workshop	Before final version	Schedule a time to meet with me.
Final Version	Tuesday, November 13	In class

The peer review process:

1. Schedule a time to meet in pairs or groups of 3. Come to the meeting with draft 1 completed.
2. Person 1 presents their proof on the board; Person 2 analyzes each step:
    1. Is this step intelligible or nonsense?
    2. Does this step say what the Person 1 thinks it says?
    3. Does this step follow from the previous steps?
    4. Is it clear why this step follows?
3. Switch roles and repeat (2).