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| Math 373: Sheet #1 |

1. Let be any collection of topologies on a set . Prove is a topology on .
2. Let . Let be the collection of subsets of consisting of and all subsets of with the form , .
3. Prove that is a topology on .
4. List the closed subsets of .
5. Let , find , , and . **JUSTEFY YOUR ANSWER**
6. Let be topological space such that there exists a countable bases for . Prove there exists a countable dense subset of . Show that with Co-finite topology does not have a countable base.
7. Prove the following” Let be open and onto function, and let be a base for . Then is a base for .
8. If and are subsets of the space .
9. Prove that .
10. Give an example to show
11. Let and be subsets of the space .
12. Prove that .
13. Give an example to show the reverse inclusion in part (i) need not hold.
14. Let and be subsets of the space , and suppose . Prove .
15. In usual topology, do An open set? Closed set? Neither? Both?
16. Prove that if is a dense subset of a space , and is a non-empty open set of , then .
17. Show that every infinite subset of infinite co-finite space is dense in .