

Grading Key for Homework 2

Instructor: Dieter van Melkebeek

Problem 1 (7 points)

- Subdivision (a) carries 4 points
- Subdivision (b) carries 3 points

Problem 2 (7 points)

- Subdivision (a) carries 5 points
- Subdivision (b) carries 2 points

Problem 3 (13 points)

- Subdivisions (a) carries 3 points
- Subdivisions (b) to (f) carry 2 points each

Problem 4 (7 points)

- Subdivision (a) carries 4 points
- Subdivision (b) carries 3 points

Problem 5 (6 points)

Each subdivision carries 3 points

Extra Credit (8 points)

Common Mistakes

- While proving you can only use axioms or lemmas that have already been proved. If you are using any new lemma then you would have to prove it first before using it.
- When asked to prove a proposition giving an example for which it holds is not sufficient. If you are disproving it, then a counter example would be sufficient. In all other cases, you would have to choose one of the formal methods of proof discussed in class to give a more

generalised proof.

For example, in problem 3a, choosing sample sets A and B and showing that A-B and $A \cap B$ are not countable will not be enough. It will just say that the proposition does not hold for this particular example. It in no way can be used to prove that there exists no such sets A and B. In such cases you would require generalised proofs.

Whereas for problems 3b to 3d, since the proposition states "There exists" giving a single example for which the property holds will be sufficient.

- While trying to prove a proposition, you need to be sure of whether you are proving the proposition or its converse. In some cases you might have to prove both. For example in question 2a, many of you had successfully proved that $M_{lcm(a,b)} \subseteq M_a \cap M_b$ but had failed to prove the converse which is $M_a \cap M_b \subseteq M_{lcm(a,b)}$.
- For problem 5b it would have been sufficient to say that all relationships except where each person knows only two others would satisfy the property instead of listing all possible combinations. However, this is not a mistake. It will just save you a lot of time.