

Graphtheory Proof Techniques

1 General Problem Solving, Testprep

- (i) Look at small examples
- (ii) what similar problems theorems do I know what is different
- (iii) take a step back and dont get fixiated on the first idea and try a completely different way of looking at the problem
- (iv) start with the most difficult problems
- (v) work on a problem as long as I can make progress, if I do not know how to continue switch to another problem
- (vi) see solution in big picture, “does this make sense?”
- (vii) relax while taking test, focus on breathing
- (viii) see test as sports event to show of all the hard work in the past

2 Basics

Minimality/Maximality of Object Assume that you have a shortest or longest walk,path and show that you can get a contradiction by a constructing a shorter / longer path.

Assume the opposite and find contradiction Lets assume for the sake of contradiction...

Induction

Induction with different cases after removing a vertex If removign a leaf from a tree there can be multiple cases to be considered depending on for example the new maximum degree

Some parameter has specific value try to show lower bound and upper bound by general example for all $n \in \mathbb{N}$

3 probabilistic method