

Slide 1

### Administrivia

- Course “useful links” page has links to more examples of induction.

Slide 2

### Mathematical Induction, Continued

- Basic idea is to prove something true for all integers greater than some base value (usually 0 or 1) in two steps:
  - Base case — prove directly for smallest value.
  - Inductive step — prove that if true for  $k$  (first principle), or all numbers from base case through  $k$  (second principle), then also true for  $k + 1$ .
- Works because the base case gives you a starting point, and the inductive step can be used to build up a sequence of implications, and then from propositional logic . . .
- Inductive step is conceptually similar to what you do in writing a recursive function/procedure — break up problem for  $k + 1$  into “smaller problems” that you can “solve” with the inductive hypothesis.

### Mathematical Induction, Examples

- Section 2.2 problem 31.
- Section 2.2 problems 64.

Slide 3

### Minute Essay

- None — quiz.

Slide 4