# 1

1. In an inductive proof verifying the condition for n = 1 (or the lowest possible value) is called the Base Case.
2. In the induction step first we assume P(n), called the inductive hypothesis for some n,
3. and then we show that P(n + 1) is true as well.
4. A recurrence relation is an equation that recursively defines a sequence of elements.

# 2

Base case:

Inductive step:

Let’s assume that

Then,

By inductive hypothesis,

Thus, Q.E.D

# 3

Base case:

Inductive Step:

Let’s assume that

Q.E.D

# 4

Base case:

Inductive step:

Let’s assume that , or for some

Thus, by definition,

Then,

Since are integers, is also an integer.

Q.E.D

# 5

Part A:

Part B:

Part C:

# 6

Part A:

*S* =

Part B:

I am unclear about proving with Structural Induction for this problem.

# 7

Part A:

(Characteristic equation.)

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(Repeated roots.)

(General form due to repeated roots.)

(Initial condition.)

(Initial condition.)

(Solved based on initial conditions.)

(Closed form representation.)

Part B:

(Characteristic equation.)

(Solved for and .)

(General form.)

(Initial condition.)

(Initial condition.)

(Solved based on initial conditions.)

(Closed form representation.)