**1.) Determine the matrix product in terms of n:**

**2.) Using induction on n, prove for all positive integers n that:**

Where denotes the Fibonacci number

Induction on n

LHS Substitution

RHS Fibonacci Sequence

Induction Hypothesis:

Exponents

Induction Hypothesis

Arithmetic

Arithmetic

Arithmetic with Fibonacci

Induction Principle

**3.) Prove by induction on n, for all positive integers n:**

Induction on n

Substitution

Arithmetic

Induction Hypothesis:

Induction Step:

Arithmetic

Definition of Summations

Induction Hypothesis

Arithmetic

Arithmetic

Definition of Factorial

Induction Principle

**4.) Prove by induction on n, for all positive integers n:**

Induction on n

Substitution

Arithmetic

Induction Hypothesis:

Induction Step:

Arithmetic

Definition of Summation

Induction Hypothesis

Arithmetic

Arithmetic

Arithmetic

Arithmetic

Induction principle

**5.) Prove by induction on n, for all positive integers n:**

Induction on n

Substitution

Arithmetic

Induction Hypothesis:

Induction Step:

Arithmetic

Exponents

Induction Hypothesis

Powers

Distribution

21( Distribution

21( is divisible by 21 Distribution

By induction

**6.) Let be a sequence defined as follows:**

**a.), b.) , c.) for**

Substitution

Arithmetic

Arithmetic

Substitution

Arithmetic

Arithmetic

Inductive Hypothesis:

Inductive Step:

Definition of a Sequence

Inductive Hypothesis

Commutativity

Definition of a Sequence

for By Induction