LARSON—MATH 350—CLASSROOM WORKSHEET 13
Binary Trees & Bijective Proofs

Organizational Notes

1. A Zoom recording link and class notes will be sent out after each class.

2. Remember to send your answers to the classroom worksheets. Title your email with enough to help me record your “participation”.

3. Homework 3 (h03) is due Thursday, Oct. 1.

4. Test 1 is Tuesday, Oct. 13.

Review

1. What is a bijective proof?

Binary Trees (Sec. 1.5)

1. Show that \( \binom{n}{k} = \binom{n}{n-k} \).

2. Show that every binary tree on \( n \) nodes can be associated to a unique triangulated polygon with \( n + 2 \) sides.

3. What can you conclude?

4. Show that every triangulated polygon with \( n + 2 \) sides can be associated to a unique binary tree on \( n \) nodes.

5. What can you conclude?

Plane Trees (Sec. 1.5)

6. What is a plane tree?

7. How many plane trees are there with 2 nodes?
8. How many plane trees are there with 3 nodes?

9. How many plane trees are there with 4 nodes?

10. How many plane trees are there with 5 nodes?

11. Can you conjecture how many plane trees there are with \( n + 1 \) nodes?

12. Can you prove your formula?