Combinatorics and Graph Theory
Day One Problem Sampler

1. In how many ways can a group of 10 elect a president, vice-president, and sergeant-at-arms?

2. In how many ways can a group of 10 elect a committee of 3?

3. How many socks do you need to pull from a drawer of 10 pairs to ensure that you have a pair?

4. How many people do you need to have in a room to ensure that you have at least 2 with the same birthday?

5. In how many ways can we make change for $1 using only dimes and quarters?

6. In how many ways can we make change for $1 using nickels, dimes, and quarters?

7. Suppose that we have a line of n chairs. How many ways can we paint them red or blue?

8. Suppose that we have a line of n chairs. How many ways can we paint them red or blue *if no two consecutive chairs may be blue?*

9. The Benevolent Bank will triple your money each day, but will then charge you $2 each day to do so. If we start out with $1, how much money do we have at the end of a week? What if we start with $2?

10. In the town on top (on the back), can you cross each bridge exactly once and return to where you've started? Why or why not?

11. If you are allowed to build one more bridge, can you do it? What if you are allowed to build 2?

12. For each of the figures in the middle on the back, can you draw a path that visits each vertex exactly once and returns to the starting point?

13. For the map of the Western US given below on the back, how many colors do you need to color each state such that no two adjacent states get the same color?