HW 1: Group work and pre-calculus

Due: Thursday, September 5th in class

Purpose: This homework has a two main goals:

- Establish a successful environment for *productive* group work.
- Practice some important pre-calculus skills.

Task: Work in your group to answer the following questions. The final few questions are reflections on how the group work went and can be answered after class if we run out of time.

Questions:

1. What are the names of your fellow group mates? What is one interesting fact about them?
2. In this class we will spend a large amount of time working in small groups.
   - What expectations and behaviours lead to productive group work?
   - What are different roles members can hold in a productive group?
   - What are potential pitfalls or challenges to productive group work?
3. Lewis & Clark recently built two Olympic size swimming pools in the basement of Pamplin (this may or may not be true). As a prank, students filled one of the swimming pools with beach balls and the other with ping pong balls. Of course, each pool still has a lot of empty space in between the balls. Which pool has more empty space? Explain why and convince your group mates.
4. Problem 0.1.44 (This means section 0.1 in the book, problem number 44.) Find the domain of the function $f(x) = (x-1)^{1/3}$.
5. Problem 0.1.47 Find the domain of the function $f(x) = \frac{4}{x^2-1}$.
6. Use technology to graph $f(z) = \frac{3z+4}{z+1}$ and find the vertical and horizontal asymptotes. (If you have a computer, `https://www.desmos.com/calculator` is an easy way to do this).
7. In at least one full English sentence, explain what the function $\arctan(x)$ does. Use any method to find the vertical and horizontal asymptotes of $\arctan(x)$.
8. This question should be answered individually. How successfully did your group function today? What did your group do well? What could your group improve on? What types of norms or behaviours do you think this class should use to ensure productive group work in the future?

If you have extra time, discuss your answers to question 7 as a group.