

# Main Exercises Week 11

MATH 130: Calculus I, Section 2 & 3

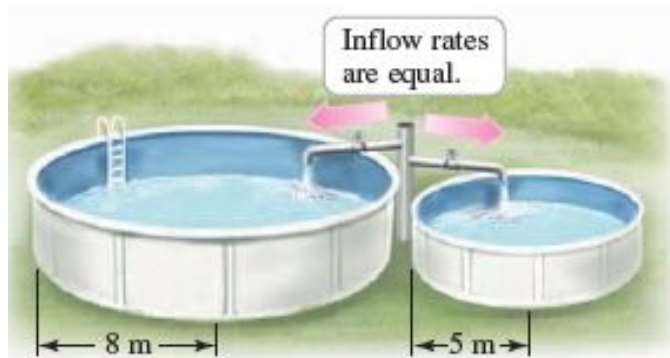
Your Name (Print): \_\_\_\_\_

**Follow the general guidelines for the Main Exercises assignments (the salmon colored handout).** Be sure to **staple** together your pages if you have more than one, and include your **name** at the top. Neatness is appreciated, makes a good first impression, and can earn you a bonus point!!!

**Due:** at the beginning of class on Friday, April 6th

**Remember:** Your write-up should be **your own**. You may discuss these problems with others, but **you should be alone when you write them up**, using only outlines of any group or Intern discussions. **EXPLAIN** and **SHOW YOUR WORK!!!** Final answers will not receive full credit without supportive explanations. You may use your own paper on which to write these up.

1. Two cylindrical above ground pools are being filled with water simultaneously *at the exact same rate* (in  $\text{m}^3/\text{min}$ ). The smaller pool has a radius of 5 m and the larger pool has a radius of 8 m. If the water is rising at a rate of 0.5 m/min in the smaller pool, how fast is the water rising in the larger pool. Hint: First find  $dV/dt$  for the smaller pool. This is like two mini-related rates problems in one! Be sure to show **ALL** steps (for both)! The steps are there to help you!



2. Find the absolute minimum and maximum values of  $f$  on the interval  $[-1, 1]$  if  $f(x) = \ln(x^2 + x + 1)$ . Be sure to show all your work and make clear that you have checked all possibilities (for example, in general there are two possibilities for where a critical point can occur; show that you have checked both). Also, use exact values not estimates (anything in decimal will likely be an estimate!).