

Math 103, Fall 2014  
Week 8

After Class Homework  
Due Monday, October 27

1. We pour water into a conical cup which is 8 inches high and whose radius at the top is 2 inches. We pour water into the cup at a rate of 1 cubic inch per minute. When the cup is half full, how quickly is the water level rising?
2. We inflate a spherical balloon with 0.5 cubic meters of air per minute. When the balloon has radius 0.75 meters, how quickly is the radius growing?
3. The radius of a circular puddle grows at a rate of  $1\text{cm}^2$  per day. When the radius is  $10\text{cm}$ , how quickly is the area increasing?
4. One day you measure the area of the same circular puddle by measuring its radius. If your measurement of the radius is off by 1%, what percent is your calculated area off by?
5. Use a linearization to estimate  $e^x$  at  $x = \ln 3 + 0.001$ .