Math 8
Winter 2020

Preliminary Homework
Assigned Monday, February 24
Due Wednesday, February 25

Note: Preliminary homework is always graded credit or no credit. **You get full credit for completing the assignment, whether or not your answers are correct.** The purpose of preliminary homework is to start you thinking about the topic of the next class.

You may use your preliminary homework in activities with your classmates. You should be sure to think about these questions so you will be prepared.

Preliminary homework is always due at the *beginning* of class.

Assignment: A drone flies above the garden of a prison. A wall is placed along the West–East axis, and a bird nest is placed on top of the wall. At time $t = 0$, the drone departs from the top of the wall, above the bird nest.

We look at the drone position with a satellite, which means everything looks flat. Let θ be the angle formed by the East part of the wall, the bird nest, and the drone. This is defined whenever the drone is not above the bird nest.

1. Assume at time t_0 (this is not the initial time), the position of the drone is 6 meters North of the wall, and 3 meters East of the nest. What is the value of the angle θ?

2. From this position, the drone flies m meters North. What is the new value of θ?

3. Between times $t = 0$ (seconds) and $t = 5$, the drone moved at a rate of $\frac{1}{1+t}$ m/s North, and $2t$ m/s East. At time $t = 4$, it was located 16 meters East of the bird nest, and $\ln(5)$ meters North of the wall. At time $t = 4$, how fast was the angle θ changing? This should be described by a derivative $\frac{d\theta}{dt}$.