

MATH 111: Techniques of Calculus II

Section 1: 110 Osmond Lab, TR 10:10 AM - 11:00 AM

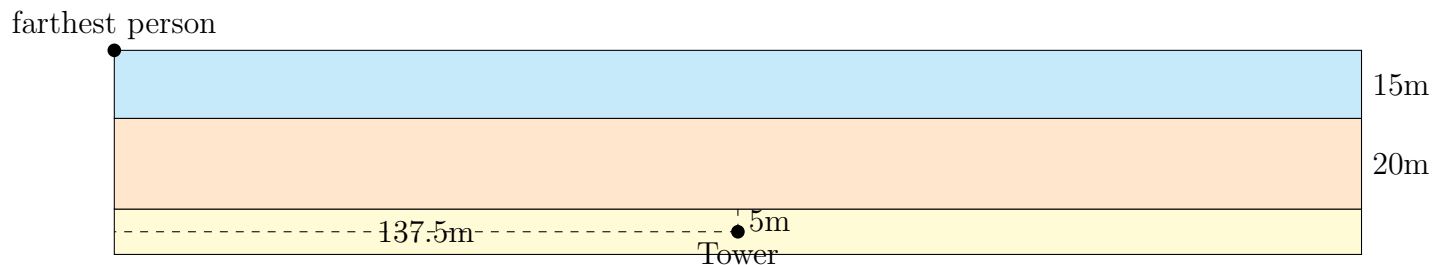
Section 2: 106 Osmond Lab, TR 1:25 PM - 2:15 PM

Due: April 21 @ midnight

According to the World Health Organization, drowning is the 3rd leading cause of unintentional deaths globally. It is estimated that 372,000 people drown annually, although this is widely believed to be an underestimate.

In most developed nations, public beaches contains lifeguard towers at regular distances. After a significant number of drownings, Vespucci Beach is looking to set up a new system for lifeguard towers. These taller towers will give lifeguards a better view of the beach. Unfortunately, they need to be built along the board walk.

The initial plans is to have the towers built every 275 meters. Suppose the beach is roughly 20 meters wide and the guard tower is 5 meters into the board walk. Swimmers typically go out between 10 and 15 meters. See the picture below.



You are asked to assess this set up. Can lifeguards get to the farthest person fast enough to save them? Assume the following:

- A lifeguard has 1 minute to get to a drowning victim upon spotting them.
- A physically fit person can
 - run at 10 miles per hour on concrete (i.e. the boardwalk)
 - run at 4 miles per hour on sand
 - swim at 2 miles per hour in the ocean.

By your estimation, can a lifeguard save a person in the farthest part of their region (see image above)? Explain your answer. Use your answer to assess the Vespucci Beach plan for lifeguard towers.

There is no page limit on the solution. The format is the same as with previous assignments.