# Irrigation Problem

Design a linear irrigation system to uniformly spray water on a rectangular field if the irrigation device moves across the field at a constant rate in a linear fashion as shown below:

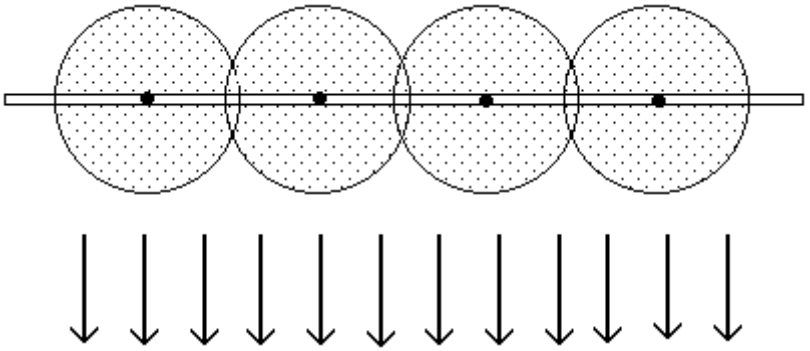

Figure 1: Linear Irrigation System

**See: https://www.youtube.com/watch?v=H8-KJawYwrg**

The linear irrigation system consists of a long water pipe, generally set on wheels that keep it above the level of the plants. Nozzles are placed periodically along the pipe, and each sprays water in a circular region. The entire system moves slowly down the field, watering the plants beneath as it moves. You would like to build a linear irrigation system for a small field in which you grow a variety of vegetables.

You have 400 feet of pipe and 20 nozzles available. The nozzles deliver a fairly uniform spray to a circular region 25 feet in radius. One pipe set is to be used to water a rectangular field 375 feet wide and 1000 feet long.

a) Determine the placement of the nozzles that produces the most uniform distribution of water on this field.

b) The flow rate of the water through the pipe is 40 gallons of water per minute. How rapidly should the irrigation system move so that no part of the field should receive more than 0.5 inch per hour of water, and each part of the field should receive at least 1 inch every 5 days.