# Quadratic applications

Sewage treatment

In one step in waste treatment, sewage is exposed to air by placing it in circular aeration pools. One sewage processing plant has two such pools, with diameters of 38 and 44 meters.

In practice, bridges are built with expansion spaces to avoid such buckling. Have you every noticed the “thawk, thawk” sound when you cross a bridge in a car? This sound is created when crossing an expansion space

1. Find the combined area of the pools.
2. To meet new clean-water standards the plant must double its capacity by building another pool. Find the radius of the circular pool that the engineering department should specify to double the plant’s capacity. Why isn’t the radius of the new pool the sum of the radii of the two pools we already have?

## Bridge Expansion

During the summer heat, a 2-mile bridge expands 2 ft in length. If we assume that the bulge occurs straight up the middle, how high is the bulge?

## Ramps for the Disabled

Laws regarding access ramps for the disabled state that a ramp must be in the form of a right triangle, where every vertical length of 1 ft has a horizontal length of 12 ft. Steps are typically 7” in height. If the entrance to a building has 5 steps, what must the length of a ramp be to access the building.



**b**

**c**

**a**

Driving Safety

Study research uses the model  to estimate the least number of feet, , in which a car can be stopped at various speeds, in miles per hour. If it took a car 550 feet to stop, estimate the car’s speed at the moment the brakes where applied.