General Problem:
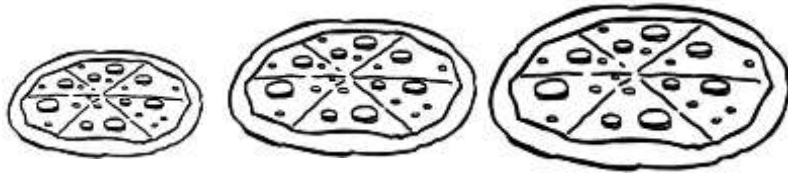
A pizza company sells a small (10") pizza for $8, a medium (12") for $10, and a large (14") for $13. Which pizza is the best value? Why?

Calculus Problem:

Some highways in southern states (where it never freezes) have a special "traction coat" of asphalt that is porous so that water drains *into* the road instead of across the highway. Both the surface of the road and the interior surface below the traction coat are curved.

Below is a cross section of one such road. If the porosity of the traction coat is 20%, meaning that 1 cubic inch of asphalt can hold 0.2 cubic inches of water, how much water can one foot of the road hold?

(In reality the water *should* be constantly draining out of the road too…)

Porous (20%) traction coat

Impermeable strength layer

6"

7"

6"

3"

Parabolic arcs

50'
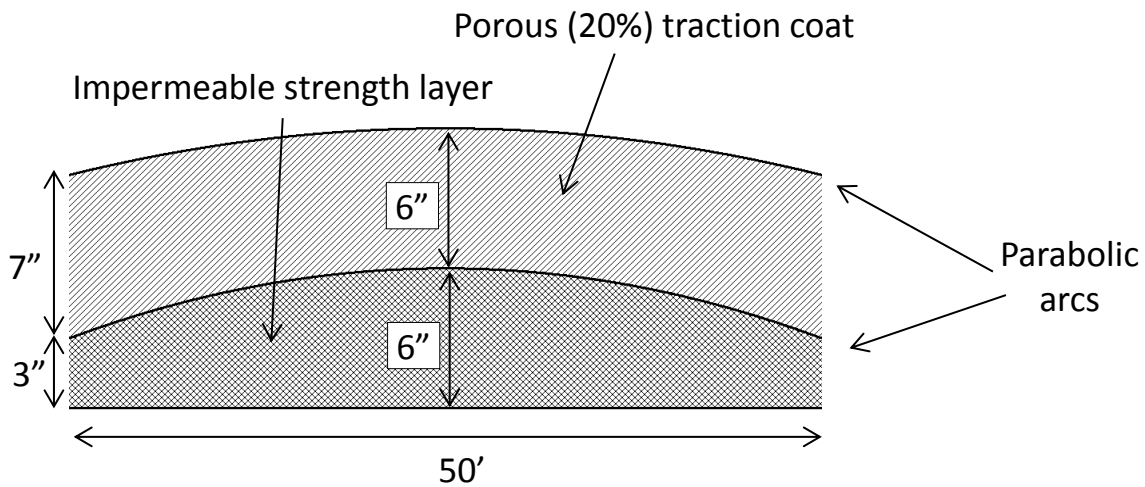
Challenge Problem:

Consider a regular hexagon with total area of 6 square feet. Let's say that choosing a subset of these vertices selects the polygon formed by connecting those vertices so that no two edges cross.

Can you find six such polygons whose areas are, respectively, 1, 2, 3, 4, 5, and 6 square feet? If so, what is the smallest total number of edges needed?

For instance, if you can find a triangle for each of the six areas, then the total number of edges is $6 \cdot 3 = 18$.