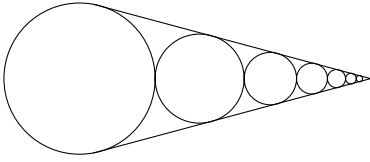


Math 253 Lesson 8 - Applications of Geometric Series

1. To control an agricultural pest called the medfly (Mediterranean fruit fly),  $N$  sterilized male flies are released into the general fly population every day. If  $s$  is the proportion of these sterilized flies that survive a given day, then  $N \cdot s^k$  of the first  $N$  released will survive for  $k$  days. [This is not how many there are after  $k$  days, only how many of the initial released are left after  $k$  days.]
  - a. How many sterile flies are there after  $n$  days? What happens in the long run?
  - b. If  $s = 0.9$  and 10,000 sterilized males are needed to control the medfly population in a given area, how many should be released every day?
  
2. A ball is dropped from 5 meters and each time it hits the ground it bounces to  $\frac{3}{4}$  times its previous height. Supposing the ball bounces straight up and down an infinite number of times, determine its total distance travelled.

3. In the figure there are infinitely many circles approaching the vertex of a  $30^\circ$  ice-cream cone. Find the total area occupied by the circles if the lengths of the sides of the cone are 1.



4. In the figure there are infinitely many circles approaching the vertices of a square with side lengths of 2. Determine the total area of the circles.

