DoNow

1. Find the family of functions that are solutions to the differential equation:

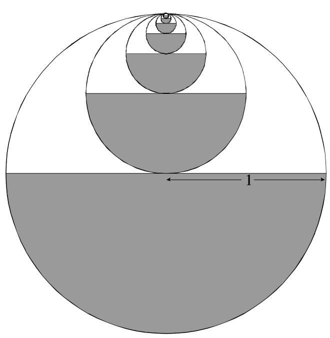
$$\frac{dy}{dx} = ky$$

Converging Geometric Series

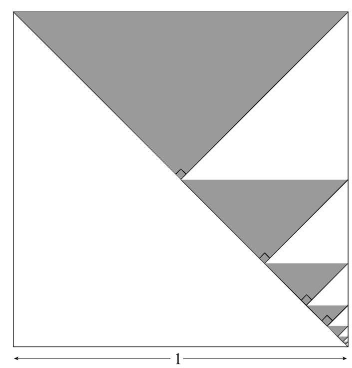
2. Show how to find $S_n = \sum_{k=0}^{n-1} ar^k$. Under what conditions will the sequence $\{S_n\}$ converge as $n \to \infty$?

3. A rubber ball rebounds to two-thirds the height from which it falls. If it is dropped from a height of four feet and is allowed to continue bouncing indefinitely, what is the total distance it travels?

4. Compute the sum of the shaded areas for each figure.



(a)



(b)

Fibonacci Fun

5. A Fibonacci sequence is defined recursively as $f_1 = 1, f_2 = 1, f_n = f_{n-1} + f_{n-2}$.
   (a) Write out the first 7 terms of the sequence.
   (b) Now consider the sequence $\{r_k\}$ where $r_k = \frac{f_{k+1}}{f_k}$. Write out the first 7 terms of this sequence.
   (c) Should r_n converge as $n \to \infty$? If so, find the limit. If not, explain how you know.

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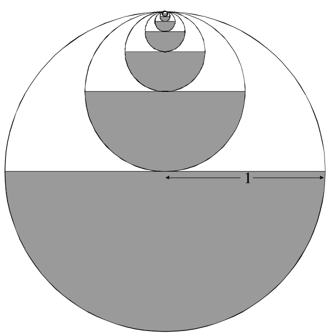
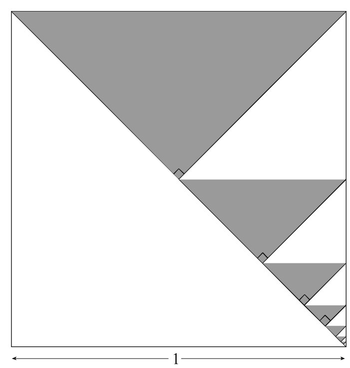


(a)



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Fibonacci Fun

5. A Fibonacci sequence is defined recursively as $f_1 = 1, f_2 = 1, f_n = f_{n-1} + f_{n-2}$.

   (a) Write out the first 7 terms of the sequence.

   (b) Now consider the sequence $\{r_k\}$ where $r_k = \frac{f_{k+1}}{f_k}$. Write out the first 7 terms of this sequence.

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