Example 1. Compute

$$\sum_{n=2}^{\infty} \frac{3^{0.4n}}{4^{n+1}}$$

Example 2. A ball has the property that each time it falls from a height h onto the ground, it will rebound to a height of rh, where $r = 0.5$ and $h = 13$ meters. Find the total distance traveled by the ball.

Example 3. The US discovers and colonizes an uninhabited island. Initially 552 infertile people are sent to colonize the island, and each subsequent year 552 infertile people are sent to the island. The annual death rate is 7%. Find the eventual population of the island after several years, just before a new group of 552 infertile people arrive on the island.

Example 4. How much money should you invest today at an annual interest rate of 6.7% compounded continuously so that, starting 2 years from today you can make annual withdrawals of $2600 in perpetuity?

Example 5. A series of line segments are drawn inside a right triangle as follows:

1. An altitude is drawn from the right angle of the triangle.
2. In the new smaller right triangle formed that contains the smallest angle of the original triangle, another altitude is drawn from the right angle of that triangle.
3. This process continues indefinitely, always moving toward the smallest angle of the original triangle.

Find the sum of the lengths of all these line segments if the original triangle has an angle of $55°$ and the side adjacent to the $55°$-angle has length 22.