4. [12 points] Zeno’s paradox says that one can never arrive somewhere because one must always first travel half-way there—and that having traveled half-way there, one must travel half of the remaining distance, then half of the distance remaining after that, etc.

(a) [4 points of 12] Suppose that you start with the goal of traveling 20 km. Let \(d_n\) be the total distance that you have gone after having traveled the \(n\)th half-distance to your goal. Find \(d_1\), \(d_2\), \(d_3\) and \(d_4\).

(b) [6 points of 12] Find a closed-form expression for the distance you’ve traveled after \(n\) half-distances.

(c) [2 points of 12] What is the sum as the number of half-distances traveled goes to infinity? (That is, how far do you travel if you continue “forever”?)