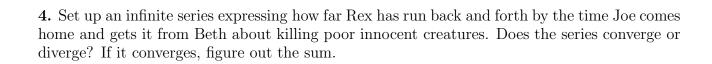# The Hunter and His Dog

Math 42, Fall 2004

Hunter Joe is returning home with his loyal dog, Rex, by his side. Joe is carrying some ducks that he killed on the hunt, so he walks slowly, at 3 miles per hour. Meanwhile, Rex can run at 12 miles per hour.

1. When they are a mile from Joe's cabin, Rex gets too excited, and runs home. As soon as he gets home, he gives a lick hello to Joe's wife Beth (who's not too thrilled about her husband killing sweet innocent ducks), and turns around and runs back to Joe. Meanwhile, Joe keeps walking toward home at 3 miles per hour. Where do they meet? How far has Rex run?

2. When Rex meets up with Joe, he repeats his pattern: he runs home, gets a treat from Beth, and runs back. Where do they meet the second time? What's the total distance Rex has run?

3. Suppose that Rex keeps running back and forth while Joe walks toward home. Set up a (finite) series that expresses how far Rex has run after n trips back and forth.

4. Set up an infinite series expressing how far Rex has run back and forth by the time Joe comes home and gets it from Beth about killing poor innocent creatures. Does the series converge or diverge? If it converges, figure out the sum.

5. Considering that Rex first took off when Joe was a mile from his cabin, what is the total time he spent running? Use this to figure out his distance traveled and check your answer to Question 4.