Bonus problem 4  
Due 9/29

Two problems this week. The theme is “fun with the harmonic series” (you can consider that a mild hint).

(a) An ant starts on one end of an elastic rope which is one foot long. He crawls toward the other end of the rope at a rate of one inch per minute. After each minute, however, while the ant rests briefly from his strenuous exercise, the rope is stretched an extra foot by a malevolent human. (So after the first minute, the human pulls the other end of the rope to make it two feet long; after the second minute, the human pulls the rope to make it three feet long; and so on.)

Assume that when the rope is stretched, it is stretched uniformly; so the spot on the rope that the ant is sitting on will in fact move (with the ant on it) a little further away from the starting point.

Does the ant ever reach the end of the rope? If so, how long does it take him? If not, why not?

(b) Do #12, p. 798 of the book.