## Attendance Quiz # 4 for Dr. Z.'s MathHistory for Lecture 4

**NAME:** (print!) \_\_\_\_\_

E-MAIL ADDRESS: (print!)

1. Two bike-riders, A and T have a race. A rides at a constant speed of 32 miles per hour, while T is much slower, and rides at a constant speed of 16 miles per hour.

To make it fair, T gets a head-start of 16 miles.

(a) Spell out Zeno's proof that A will **never** catch-up to T.

(b) Use high-school algebra (the formula that distance=speed multiplied by time) to predict at what time, in spite of Zeno, A will catch-up with T after all.

(c) Express the meeting time as an 'infinite' geometric series, and use the formula for summing an 'infinite' geometric series to get the same answer as (b).

(d) If, like Dr. Z. (and much greater people, like Hermann Weyl), you dislike 'infinite' sums, resolve the paradox, by assuming that the 'atom' (smallest unit) of time is  $\frac{1}{32}$  of an hour. Compile a table of each successive step in the Zeno description of the race, but rather than going for ever, stop when it is no longer possible to sub-divide time.