

Larry's Law Firm, 1729 Easy Street , Big City, PU 11235

Honors Calculus Students
Winthrop University
Rock Hill, SC 29733

September 18, 2013

Dear Calculus Students,

I'm a new lawyer at a prestigious law firm here in Big City, PU. Our firm was recently engaged to argue the speeding ticket of one Billy B. Bartholomew, owner of the Bartholomew Bicycle Barn. Since speeding tickets are, quite frankly, low on the firm's list of publicity-generating cases, it was assigned to the new-comer (i.e., me). It's my first case and, even though it's not a life-and-death matter, I'd still like to do a good job. The problem is, I've gotten in over my head with the mathematics involved, and so I was hoping that you could help me. It was your intrepid and enterprising professor, Dr. Abernathy, who referred me to you.

Billy lives in Wheeling, PU, a suburb of Big City, where she runs her Bicycle Barn. Several Fridays ago, she peddled over the hills to a nearby town, Speedwell Valley, to give a demonstration for some bicycle enthusiasts. (She did not know at the time that one of these was an undercover police officer). Now, Speedwell Valley is a conservative town, with some obscure and out-dated laws on their books. A former mayor of Speedwell Valley, Mayor Gotcher, used to own the trolley that ran from Speedwell Valley through the hills to Wheeling and then back again. To protect his financial interests, he passed a law stating that anyone making the trip from Wheeling to Speedwell Valley faster than his trolley would be fined a "speeding" ticket of no more than \$200.

On the day that Billy rode to Speedwell Valley, she had used a speedometer to record her speed. For the first 5 miles out of Wheeling, which were flat, she traveled at a constant rate of 25 miles per hour. The next 5 miles were up-hill, and so she slowed down then to 15 miles per hour until she reached the top of the hill. Then she dashed down-hill for 5 miles to her destination, traveling this last leg at 35 miles per hour. Her presentation used the recorded data from her own trip to show how cyclists can work on maintaining a constant pace (which Billy did admirably, everybody agreed).

However, as Billy was leaving, the police officer confronted her and charged her with exceeding the Gotcher speed limit. Since she traveled at an average of 25 miles per hour for the whole trip (averaging the three speeds), he points out that it must have taken her a mere 36 minutes to cycle from her home to the demonstration, and therefore she traveled faster than the trolley (which took 40 minutes).

Billy swears that it took her just above 40 minutes to make the trip, but she also claims that her bicycling data is accurate. Now I'm stuck: can Billy be telling the truth? But if so, how? And if not, how do I defend her against these accusations?

This is why I'm asking you for help - in hopes that you can answer these questions for me. If there is any way that you can find an answer to this dilemma, I'd be incredibly grateful. I would appreciate an answer as soon as possible, but certainly no later than October 2, as our preliminary hearing is the day after.

Yours sincerely,

E. Noether, Attorney
Larry's Law Firm