Math 163 **Problem of the Week** **Week 6-7**

Directions: Please be sure to follow the directions as listed in the syllabus.

(**Due: November 20**) Let L denote the frame length of a bicycle. Let θ denote the angle that the front tire makes with the frame, where $-\pi/2 < \theta < \pi/2$, and a positive angle respresents a left turn and a negative angle a right turn. Let v_b and v_f denote the speeds of the back and front tires, respectively.

a. Express v_f in terms of v_b and θ.
b. Express the curvature of the path of the back wheel in terms of L and θ.
c. Express the curvature of the path of the front wheel in terms of L, θ, and $d\theta/dt$, the rate at which the handlebars are turning relative to the bike.