Here’s an extra credit problem for Test #2. If you have questions about it, please let me know. (Up to 20 extra points depending on completeness of your response.)

We defined our conics (both in Euclidean and taxicab geometry) in a particular way. For example, the ellipse we defined to be the set of points, \( P \), for which \( PA + PB \) is constant, for a fixed constant and fixed points \( A \) and \( B \). We had similarly constructed definitions for the other conics.

In the case of the parabola, we defined it to be the set of points \( P \) that were equidistant from a fixed point (the focus) and a fixed line (directrix). We could actually modify this definition slightly, to create what might be called the eccentricity definition for all the conics (forget about the circle for now). This definition of the conics goes something like this:

Let \( F \) be a fixed point and \( L \) a fixed line. Then, the set of points \( P \) (in the plane) for which \( PF/PL = e \) (a positive constant) is said to be a conic of eccentricity \( e \).

- If \( 0 < e < 1 \), the conic is an ellipse.
- If \( e = 1 \), the conic is a parabola.
- If \( e > 1 \), the conic is a hyperbola.

Show how you can construct taxi-conics using this eccentricity definition given a focus and directrix. (Consider diagonal directrices as well.)