Math 1166: Homework 8
Due: Thursday, April 18th

1) Recall the method in Euclidean geometry of constructing an equilateral triangle on a given segment. Suppose a "city geometry compass" draws a city geometry circle. Imagine using such a "city geometry compass" below.

(a) Construct a "city geometry equilateral triangle" on the segment defined by the points $(0,0)$ and $(4,0)$. Explain your steps.

(b) Now construct a "city geometry equilateral triangle" on the segment defined by the points $(0,0)$ and $(2,2)$. Explain your steps.

(c) Will the construction always give a (unique!) equilateral triangle? What does "unique" mean in this context? Give a detailed discussion.

2) Consider the following equations:

$$x^2 - y^2 = 0 \qquad y = \pm x \qquad y = \pm|x|$$
$$(y - x)(y + x) = 0 \qquad x = \pm y \qquad |y| = |x|$$

(a) Which equations are equivalent to which other equations? Say how you know. Be sure to state what it means for the equations to be equivalent.

(b) For each set of equivalent equations, graph the solution set, and describe how each of the equations provides a different way about thinking about that solution set.

3) Do problem 5.3.10.