Math 128, Modern Geometry

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Due Friday. Exercises from chapter 5: 1, 2, 3a, 4, 6 (first two), 8a.

First test. Friday, September 30.

Last time. We saw that the only Möbius transformation that had more than two fixed points was the identity transformation. We defined cross ratios

$$(z_0, z_1, z_2, z_3) = \frac{z_0 - z_2}{z_0 - z_3}\,\frac{z_1 - z_3}{z_1 - z_2}$$

and later showed cross ratios were invariants of Möbius geometry. We used cross ratios to define Möbius transformations

$$T(z) = (z, z_1, z_2, z_3) = \frac{z - z_2}{z - z_3}\,\frac{z_1 - z_3}{z_1 - z_2}$$

that map

$$z_1 \mapsto 1, z_2 \mapsto 0, z_3 \mapsto \infty.$$

We proved the Fundamental Theorem of Möbius geometry that said there's a unique Möbius transformation that sends three given points to three other given points. We then defined "clines," figures that include both Eucidean straight lines and circles, and noted that clines are invariant figures in Möbius geometry.

Today. We'll look at inversion in a circle.

Inversion. There's a discussion in my website on *Compass Geometry* at

`http://aleph0.clarku.edu/~djoyce/java/compass/`

We'll look at the pages on "summary of inversion".