# Math 532: Homework 6
Due 10/09/19
Everyone turns in an individual copy.

## Problems

1. (2pts each) 3.30.6, 3.30.12, 3.33.4

2. (5pts) *Stereographic Projection on the Circle.* So, we want to find a mapping $f : \mathbb{R} \to S_1$ where $S_1$ is the shifted unit circle, i.e.

$$S_1 = \left\{(x, y) \in \mathbb{R}^2 : x^2 + (y-1)^2 = 1\right\}$$

   such that $f(0) = (0, 0)$ and $f(\pm\infty) = (0, 2)$. For $x \in \mathbb{R}$, using the parametrized line

$$(xs, 2\,(1-s))\,,\ s \in [0, 1],$$

   find $f(x)$.

3. (5pts) *Stereographic Projection on the Sphere.* So, we want to find a mapping $f : \mathbb{R}^2 \to S_2$ where $S_2$ is the shifted unit sphere, i.e.

$$S_2 = \left\{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 + (z-1)^2 = 1\right\}$$

   such that $f(0, 0) = (0, 0, 0)$ and $f(\pm\infty, \pm\infty) = (0, 0, 2)$. Using the parametrized line

$$(xs, ys, 2(1-s))\,,\ s \in [0, 1],$$

   find $f(x, y)$.