Problem Set #1, Bilateral Z-transforms
ECE-439, Fall 2015
Introduction to DSP
Date Assigned: 08/25/2015
Date Due: 09/01/2015

Problem # 1.0

Determine the time-domain sequence $x[n]$ whose bilateral Z-transform is given by the expression:

$$X(z) = \frac{1}{(1 - az^{-1})^p}, \quad |z| > |a|,$$

where $p > 1$ is an integer.

Problem # 2.0

Determine the time-domain sequence $x[n]$ whose bilateral Z-transform is given by the expression:

$$X(z) = \sin(z^{-1}).$$

Is this sequence a causal sequence? If so what is the region of convergence.

Problem # 3.0

Determine the bilateral Z-transform of the dual-sided sequence:

$$x[n] = a^{|n|}, |a| < 1.$$

Determine the appropriate region of convergence.