Signal Processing.

Inverse Z-transform and poles and zeros

When finding the inverse Z-transform of functions with $z^{-1}$ terms in the numerator, that fact that $z^{-1}$ can be thought of as a delay operator can be used to simplify the computation. Consider.

$$X\left(z\right)=\frac{1-z^{-10}}{1-z^{-1}}$$

1. Use the Z-transform of u[n] and the properties of the Z-transformation to find x[n].
2. If we consider X(z) a polynomial in negative powers of z, what would be its degree and the values of its coefficients?
3. Find the poles and the zeros of X(z) and plot them on the z-plane. Is there a pole or zero at z=1? Explain.