1. Compute the z-transform of $x(n) = r^n \cos(n\theta)u(n)$, using multiplication property.

2. Evaluate the convolution of a unit step function $u(n)$ with itself using z-transform.

3. Find the inverse z-transform of
$$X(z) = \frac{z+0.2}{(z+0.5)(z-1)} \text{ with } |z|>1,$$

4. $\dfrac{z}{(z-3)(z-4)}$ with $|z|<3$

5. Find the inverse z-transform of $X(z) = \dfrac{z(z^2+4z+5)}{(z-3)(z-1)(z-2)}$ for ROC (i) $2<|z|<3$, (ii) $|z|>3$, (iii) $|z|<1$

6. Check whether the corresponding LTI system with system function
$$H(z) = \frac{-(z^2 + 0.4z)}{z^2 - 2.8z + 1.6}$$
Is stable and causal, if the ROC is
(a) $|z|>2$
(b) $|z|<0.8$
(c) $0.8<|z|<2$

7. Determine the pole-zero plot for the system described by difference equation
$$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) + x(n-1)$$