$x[n] = \mathcal{Z}^{-1}\{X(z)\}$	$X(z) = \mathcal{Z}\{x[n]\}$	
$a_1x_1[n] + a_2x_2[n]$	$a_1X_1(z) + a_2X_2(z)$	$\begin{aligned} X(z) &= \sum_{n=-\infty}^{\infty}(a_1x_1(n)+a_2x_2(n))z^{-n} \\ &= a_1\sum_{n=-\infty}^{\infty}x_1(n)z^{-n} + a_2\sum_{n=-\infty}^{\infty}x_2(n)z^{-n} \\ &= a_1X_1(z)+a_2X_2(z) \end{aligned}$
$x_K[n] = \begin{cases} x[r], & n = Kr \\ 0, & n \notin K\mathbb{Z} \end{cases}$ with $K\mathbb{Z} := \{Kr : r \in \mathbb{Z}\}$	$X(z^K)$	$\begin{aligned} X_K(z) &= \sum_{n=-\infty}^{\infty}x_K(n)z^{-n} \\ &= \sum_{r=-\infty}^{\infty}x(r)z^{-rK} \\ &= \sum_{r=-\infty}^{\infty}x(r)(z^K)^{-r} \\ &= X(z^K) \end{aligned}$
$x[Kn]$	$\frac{1}{K}\sum_{p=0}^{K-1}X\left(z^{\frac{1}{K}}\cdot e^{-i\frac{2\pi}{K}p}\right)$	ohio-state.edu or ee.ic.ac.uk
$x[n-k]$ with $k>0$ and $x : x[n] = 0\ \forall n < 0$	$z^{-k}X(z)$	$\begin{aligned} \mathcal{Z}\{x[n-k]\} &= \sum_{n=0}^{\infty}x[n-k]z^{-n} \\ &= \sum_{j=-k}^{\infty}x[j]z^{-(j+k)} && j=n-k \\ &= \sum_{j=-k}^{\infty}x[j]z^{-j}z^{-k} \\ &= z^{-k}\sum_{j=-k}^{\infty}x[j]z^{-j} \\ &= z^{-k}\sum_{j=0}^{\infty}x[j]z^{-j} && x[\beta]=0, \beta<0 \\ &= z^{-k}X(z) \end{aligned}$
$x[n+k]$ with $k>0$	$z^kX(z) - z^k\sum_{n=0}^{k-1}x[n]z^{-n}$	
$x[n]-x[n-1]$ with x[n]=0 for n<0	$(1-z^{-1})X(z)$	
$x[n+1]-x[n]$	$(z-1)X(z) - zx[0]$	
$x[-n]$	$X(z^{-1})$	$\begin{aligned} \mathcal{Z}\{x(-n)\} &= \sum_{n=-\infty}^{\infty}x(-n)z^{-n} \\ &= \sum_{m=-\infty}^{\infty}x(m)z^{m} \\ &= \sum_{m=-\infty}^{\infty}x(m)(z^{-1})^{-m} \\ &= X(z^{-1}) \end{aligned}$
$a^nx[n]$	$X(a^{-1}z)$	$\begin{aligned} \mathcal{Z}\{a^nx[n]\} &= \sum_{n=-\infty}^{\infty}a^nx(n)z^{-n} \\ &= \sum_{n=-\infty}^{\infty}x(n)(a^{-1}z)^{-n} \\ &= X(a^{-1}z) \end{aligned}$
$x^*[n]$	$X^*(z^*)$	$\begin{aligned} \mathcal{Z}\{x^*(n)\} &= \sum_{n=-\infty}^{\infty}x^*(n)z^{-n} \\ &= \sum_{n=-\infty}^{\infty}\left[x(n)(z^*)^{-n}\right]^* \\ &= \left[\sum_{n=-\infty}^{\infty}x(n)(z^*)^{-n}\right]^* \\ &= X^*(z^*) \end{aligned}$

$\operatorname{Re}\{x[n]\}$	$\frac{1}{2}\left[X(z)+X^*(z^*)\right]$	
$\operatorname{Im}\{x[n]\}$	$\frac{1}{2j}\left[X(z)-X^*(z^*)\right]$	
$nx[n]$	$-z\frac{dX(z)}{dz}$	$\begin{aligned} \mathcal{Z}\{nx(n)\} &= \sum_{n=-\infty}^{\infty}nx(n)z^{-n} \\ &= z\sum_{n=-\infty}^{\infty}nx(n)z^{-n-1} \\ &= -z\sum_{n=-\infty}^{\infty}x(n)(-nz^{-n-1}) \\ &= -z\sum_{n=-\infty}^{\infty}x(n)\frac{d}{dz}(z^{-n}) \\ &= -z\frac{dX(z)}{dz} \end{aligned}$
$x_1[n]*x_2[n]$	$X_1(z)X_2(z)$	$\begin{aligned} \mathcal{Z}\{x_1(n)*x_2(n)\} &= \mathcal{Z}\left\{\sum_{l=-\infty}^{\infty}x_1(l)x_2(n-l)\right\} \\ &= \sum_{n=-\infty}^{\infty}\left[\sum_{l=-\infty}^{\infty}x_1(l)x_2(n-l)\right]z^{-n} \\ &= \sum_{l=-\infty}^{\infty}x_1(l)\left[\sum_{n=-\infty}^{\infty}x_2(n-l)z^{-n}\right] \\ &= \left[\sum_{l=-\infty}^{\infty}x_1(l)z^{-l}\right]\left[\sum_{n=-\infty}^{\infty}x_2(n)z^{-n}\right] \\ &= X_1(z)X_2(z) \end{aligned}$
$r_{x_1,x_2} = x_1^*[-n]*x_2[n]$	$R_{x_1,x_2}(z) = X_1^*(\frac{1}{z^*})X_2(z)$	
$\sum_{k=-\infty}^{n}x[k]$	$\frac{1}{1-z^{-1}}X(z)$	$\begin{aligned} \sum_{n=-\infty}^{\infty}\sum_{k=-\infty}^{n}x[k]z^{-n} &= \sum_{n=-\infty}^{\infty}(x[n]+\cdots+x[-\infty])z^{-n} \\ &= X[z]\left(1+z^{-1}+z^{-2}+\cdots\right) \\ &= X[z]\sum_{j=0}^{\infty}z^{-j} \\ &= X[z]\frac{1}{1-z^{-1}} \end{aligned}$
$x_1[n]x_2[n]$	$\frac{1}{j2\pi}\oint X_1(v)X_2(\frac{z}{v})v^{-1}\mathrm{d}v$	

$$\sum_{n=-\infty}^{\infty}x_1[n]x_2^*[n] = \frac{1}{j2\pi}\oint_C X_1(v)X_2^*(\tfrac{1}{v^*})v^{-1}\mathrm{d}v$$

$$x[0] = \lim_{z\to\infty}X(z).$$

$$x[\infty] = \lim_{z\to 1}(z-1)X(z).$$

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