

**Some Common z-Transform Pairs**

Signal	Transform	ROC
1. $\delta[n]$	1	All $z$
2. $u[n]$	$\frac{1}{1-z^{-1}}$	$ z  > 1$
3. $-u[-n-1]$	$\frac{1}{1-z^{-1}}$	$ z  < 1$
4. $\delta[n-m]$	$z^{-m}$	All $z$ , except 0 (if $m > 0$ ) or $\infty$ (if $m < 0$ )
5. $\alpha^n u[n]$	$\frac{1}{1-\alpha z^{-1}}$	$ z  >  \alpha $
6. $-\alpha^n u[-n-1]$	$\frac{1}{1-\alpha z^{-1}}$	$ z  <  \alpha $
7. $n\alpha^n u[n]$	$\frac{\alpha z^{-1}}{(1-\alpha z^{-1})^2}$	$ z  >  \alpha $
8. $-n\alpha^n u[-n-1]$	$\frac{\alpha z^{-1}}{(1-\alpha z^{-1})^2}$	$ z  <  \alpha $
9. $[\cos \omega_0 n] u[n]$	$\frac{1 - [\cos \omega_0] z^{-1}}{1 - [2 \cos \omega_0] z^{-1} + z^{-2}}$	$ z  > 1$
10. $[\sin \omega_0 n] u[n]$	$\frac{[\sin \omega_0] z^{-1}}{1 - [2 \cos \omega_0] z^{-1} + z^{-2}}$	$ z  > 1$
11. $[r^n \cos \omega_0 n] u[n]$	$\frac{1 - [r \cos \omega_0] z^{-1}}{1 - [2r \cos \omega_0] z^{-1} + r^2 z^{-2}}$	$ z  > 1$
12. $[r^n \sin \omega_0 n] u[n]$	$\frac{[r \sin \omega_0] z^{-1}}{1 - [2r \cos \omega_0] z^{-1} + r^2 z^{-2}}$	$ z  > 1$