INVERSE Z-TRANSFORM.

If $Z[f(n)] = F(z)$ then $Z^{-1}[F(z)] = f(n)$

1) $Z[a^n] = \frac{z}{z-a} \Rightarrow a^n = Z^{-1}\left[\frac{z}{z-a}\right]$

2) $Z[(-a)^n] = \frac{z}{z+a} \Rightarrow (-a)^n = Z^{-1}\left[\frac{z}{z+a}\right]$

3) $Z[n] = \frac{z}{(z-1)^2} \Rightarrow (n) = Z^{-1}$.

4) $Z[na^n] = \frac{az}{(z-a)^2}$

5) $Z[na^{n-1}] = \frac{z}{(z-a)^2}$

Method of partial Fraction:

) Find Inverse z-transform of $\frac{z-4}{(z+2)(z+3)}$ using partial fraction method (or)

Find $z^{-1}\left[\frac{z-4}{(z+2)(z+3)}\right]$.

$$\frac{z-4}{(z+2)(z+3)} = \frac{A}{(z+2)} + \frac{B}{(z+3)}$$

$$z-4 = A(z+3) + B(z+2)$$

put $z=-3 \Rightarrow B=7$

put $z=-2 \Rightarrow A=-6$

$$\frac{z-4}{(z+2)(z+3)} = -\frac{6}{z+2} + \frac{7}{z+3}$$

$$z^{-1}\left[\frac{z-4}{(z+2)(z+3)}\right] = -6z^{-1}\left[\frac{1}{z+2}\right] + 7z^{-1}\left[\frac{1}{z+3}\right]$$

$$= -6(-2)^{n-1} + 7(-3)^{n-1}$$