

Find inverse z transform by hand for

$$1. \quad 4 + z^{-2} + \frac{6}{2 + 2z^{-1}} \quad |z| > 1$$

$$= 4 + z^{-2} + \frac{3}{1 + z^{-1}}$$

$$\Leftrightarrow \boxed{4\delta[n] + \delta[n-2] + 3(-1)^n u[n]}$$

$$2. \quad \frac{z^2}{(1+z)(1-z)}, \quad |z| > 1$$

$$= \frac{1}{(z^{-1}+1)(z^{-1}-1)}$$

$$= \frac{-1}{(1+z^{-1})(1-z^{-1})}$$

$$= \frac{A}{1+z^{-1}} + \frac{B}{1-z^{-1}}$$

$$A = \frac{-1}{1-(-1)} = \frac{-1}{2}$$

$$B = \frac{-1}{1+1} = -\frac{1}{2}$$

$$= \frac{-1/2}{1+z^{-1}} + \frac{-1/2}{1-z^{-1}}$$

$$\Leftrightarrow \boxed{\left[-\frac{1}{2}(-1)^n - \frac{1}{2}\right] u[n]}$$