$$D_n = D_{n(1)} + D_{n(2)} = \frac{1}{2}\left[\frac{2}{(\omega_0 n)^2} - \frac{(e^{j\omega_0 n} + e^{-j\omega_0 n})}{(\omega_0 n)^2}\right] = \frac{1-\cos(\omega_0 n)}{(\omega_0 n)^2}$$

$$*\cos\omega_0 n = \cos\left(\frac{\omega_0 n}{2}\right)^2 - \operatorname{sen}\left(\frac{\omega_0 n}{2}\right)^2$$

$$\cos(\omega_0 n) = 1 - 2\operatorname{sen}\left(\frac{\omega_0 n}{2}\right)^2$$

$$D_n = \frac{1}{2}\cdot\frac{\operatorname{sen}(\omega_0 n/2)^2}{(\omega_0 n/2)^2} = \frac{1}{2}\operatorname{Sinc}(\omega_0 n/2)^2$$

2° Parte -

$$g(t) = \Delta(t-1) - \Delta(t-3)$$

$$g(t)\begin{cases} 2 & -1<t<0 \\ -2 & 0<t<1 \end{cases}$$

$$D_n = \frac{1}{2}\left(\frac{2\cdot e^{-j\omega_0 n t}}{-j\omega_0 n}\Big|_{-1}^{0} + \frac{2e^{-j\omega_0 n t}}{j\omega_0 n}\Big|_{0}^{1}\right) =$$

$$D_n = \frac{-1 + e^{j\omega_0 n} - e^{-j\omega_0 n} - 1}{j\omega_0 n} = \frac{2j - 2j\cos(\omega_0 n)}{\omega_0 n}$$