and writing the terms in increasing DFT index k, we have: (2/9)

$$x[n] = \left[\frac{-1}{2}\left(e^{j\cdot 0}\right) + \frac{1}{2}\left(e^{-j\cdot 0}\right)\right] + 2\left[\frac{1}{2j}\left(e^{j\pi n/2} - e^{-j2\pi n/2}\right)\right]$$

$$+ 2\left[\frac{1}{2}\left(e^{j\frac{3\pi}{4}n} + e^{-j\frac{3\pi}{4}n}\right)\right] + \left[\frac{1}{2}\left(e^{j2\pi n} + e^{-j2\pi n}\right)\right]$$

Comparing with IDFT $x[n] = \frac{1}{8}\sum_{k=0}^{7} X[k]e^{j2\pi kn/8}$

we obtain vector

$$X = \left[8, 0, -8j, 8, 8, 8, 8j, 0\right]^T$$