Solution of ECE 316 Test 9 S06

1. $3(0.8)^n \mathrm{u}[n] \overset{\mathrm{z}}{\longleftrightarrow} \dfrac{3z}{z-0.8}$

2. $3(0.8)^{n-1} \mathrm{u}[n-1] \overset{\mathrm{z}}{\longleftrightarrow} z^{-1} \dfrac{3z}{z-0.8} = \dfrac{3}{z-0.8}$

3. $3(0.8)^{n-1} \mathrm{u}[n] = 3(0.8)^{-1}(0.8)^n \mathrm{u}[n] \overset{\mathrm{z}}{\longleftrightarrow} \dfrac{3.75z}{z-0.8}$

4. $3(0.8)^n \mathrm{u}[n-1] = 3(0.8)(0.8)^{n-1} \mathrm{u}[n-1] \overset{\mathrm{z}}{\longleftrightarrow} z^{-1} \dfrac{2.4z}{z-0.8} = \dfrac{2.4}{z-0.8}$

5. $4\cos(2\pi n/4)\mathrm{u}[n] \overset{\mathrm{z}}{\longleftrightarrow} \dfrac{4z(z-\cos(\pi/2))}{z^2 - 2\cos(\pi/2)z + 1} = \dfrac{4z^2}{z^2+1}$

6. $4\cos(2\pi(n-4)/4)\mathrm{u}[n-4] \overset{\mathrm{z}}{\longleftrightarrow} z^{-4} \dfrac{4z^2}{z^2+1} = \dfrac{4z^{-2}}{z^2+1}$

7. $4\cos(2\pi n/4)\mathrm{u}[n-4] = 4\cos(2\pi(n-4)/4)\mathrm{u}[n-4] \overset{\mathrm{z}}{\longleftrightarrow} z^{-4} \dfrac{4z^2}{z^2+1} = \dfrac{4z^{-2}}{z^2+1}$

   ($4\cos(2\pi n/4) = 4\cos(2\pi(n-4)/4)$ because it is periodic with period 4)

8. $4\cos(2\pi(n-4)/4)\mathrm{u}[n] = 4\cos(2\pi n/4)\mathrm{u}[n] \overset{\mathrm{z}}{\longleftrightarrow} \dfrac{4z^2}{z^2+1}$