Opg 4.5

$$x[n] = 2.2\cos(0.3\pi n - \frac{\pi}{3})$$

$$x(t) = A\cos(2\pi f_0 t + \phi)$$

$$f_s = 6000[Hz]$$

$$x[n] = x(nT_s) = A\cos(2\pi f_0 T_s n + \phi) = A\cos(2\pi \hat{f}_0 n + \phi) = 2.2\cos(0.3\pi n - \frac{\pi}{3})$$

Heraf: $A = 2.2$ og $\phi = -\frac{\pi}{3}$

og $0.3\pi = 2\pi f_0 \quad \Rightarrow \quad \hat{f}_0 = 0.15[Hz] \quad \Rightarrow \quad f_0 = \hat{f}_0 f_s = 0.15 \cdot 6000 = 900$

Altså:

1) $\underline{x_1(t) = 2.2\cos(2\pi 900t - \frac{\pi}{3})}$

Alle mulige aliasfrekvenser: $f = \pm f_0 + lf_s \qquad l \in Z$

2) $f_2 = +f_0 + 1f_s = 900 + 6000 = 6900[Hz] < 8[kHz]$

$\underline{x_2(t) = 2.2\cos(2\pi 6900t - \frac{\pi}{3})}$

3) $f_2 = -f_0 + 1f_s = -900 + 6000 = 5100[Hz] < 8[kHz]$

$\underline{x_3(t) = 2.2\cos(2\pi 5100t - \frac{\pi}{3})}$