Homework 6

6.1

a)

$$\hat{X}_a(z) = \sum_{n=-3}^{1} (3jz)^{-n}$$

Needs to be two sided because the step function conditions make it so that n must be greater than or equal to -3, and less than or equal to 1

The R.O.C. (even though it doesn't really 'converge') should be $\frac{1}{3jz}$

b)

$$\hat{X}_b(z) = \sum_{n=-1}^{\infty} (-0.9)^{-\frac{n}{2}} z^{-n}$$

It can be one sided because the step function condition only specifies that n must be greater than or equal to -1

The R.O.C. should be $\sqrt{-0.9}$ z

c)

$$\hat{X}_c(z) = \sum_{n=-\infty}^{\infty} (0.5^n (\delta[n] + \delta[n-3] + \delta[n-11]))z^{-n}$$

It doesn't matter if the z-transform is one sided or two sided since x[n] will be 0 for all negative values of n

The R.O.C.s should be $z \neq 0$

d)

$$\hat{X}_d(z) = \frac{1}{2}[\sum_{n=2}^{\infty}\left(\frac{-0.8(e^{j0.5\pi})}{z}\right)^n + \sum_{n=2}^{\infty}\left(\frac{-0.8(e^{-j0.5\pi})}{z}\right)^n \quad]$$

It doesn't matter if the z-transform is one sided or two sided since x[n] will be 0 for all negative values of n

The R.O.C.s should be intersection of R.O.C. for each of the two sums, so it will be $0.8 < z$

6.2

a)

$$f[n] = \frac{5\delta[n+2] - 13\delta[n+1] + 17}{\delta[n+5]}$$

b)

$$h[n] = \frac{-125\delta[n-2]}{\delta[n+2] + 0.5\delta[n+1]} + \frac{23\partial[n+2]}{\partial[n+3] - 0.15\partial[n+2]}$$

c)

$$x[n] = \frac{13\partial[n+6] - 7\partial[n+4] + 3}{\partial[n+7] + 0.8\partial[n+6]}$$

d)

$$g[n] = \frac{3}{8}\cos(j0.35\pi n)\,\delta[n-1]$$

e)

$$y[n] = oh\ my\ god\ why$$