Problem 1

Compute the Fourier transform of each of the following signals:

1- $e^{-3|t|}\sin(2t)$

2- $\delta(t+1)+\delta(t-1)$

Problem 2

Compute the Inverse Fourier transform of each of the following signals:

1- $X(j\omega) = 2\pi\delta(\omega)+\pi\delta(\omega-4\pi)+\pi\delta(\omega+4\pi)$

2- $x(j\omega) = \begin{cases} 2 & 0 \le \omega \le 2 \\ -2 & -2 \le \omega \le 0 \\ 0 & |\omega| > 2 \end{cases}$

Problem 3

- Determine which of the following properties hold and which do not hold for each of the following continues time systems. Justify your answer. $X(t)$ is the system input while $y(t)$ is the system output?
- Memoryless
- Causality
- Linearity

a. y[n] = x[n-2]-2x[n-8]

b. y[n] = nx[n]

c. y(t) = x(t^3)