1. Text problem 2.4. Do not develop the expression for $y[n]$ as a function of $x[n]$. Instead, find the system I/O relation. In each part, this will be a difference equation. The difference equation will state that a linear combination of the shifts of $y[n]$ is equal to a linear combination of the shifts of $x[n]$. For parts (a) and (c), the easiest way to do this is by using the $z$-transform. For parts (c) and (d), the structures are FIR filters so the left side of the difference equation will just be $y[n]$ itself (there will not be any other shifts of $y[n]$).

2. Text problem 2.21. In part (a), the problem specifies $x_1[n]$ for $-2 \leq n \leq 2$. Outside of this range, $x_1[n] = 0$. In other words, for part (a) you should assume that $x_1[n] = 0$ for all $n < -2$ and for all $n > 2$.

3. Text problem 2.27. Remember that Mitra writes $\mu[n]$ for the unit step function. It is the same as $u[n]$ in the notes.

4. Text problem 2.39. Here is a hint for parts (c), (d), and (e): suppose that $x_1[n]$ is periodic with fundamental period $N_1$ and $x_2[n]$ is periodic with fundamental period $N_2$. Then the signal $x_3[n] = x_1[n] + x_2[n]$ is also periodic. The fundamental period of $x_3[n]$ is given by the least common multiple (LCM) of $N_1$ and $N_2$. If you need a refresher on the LCM, take a look at the Wikipedia page for “Least common multiple” and pay special attention to the section “Finding least common multiples by prime factorization.” The book briefly discusses a different way of finding LCM’s on page 60. While that algorithm is better for the computer (e.g., Matlab), it is less useful for solving these type problems by hand in my opinion.

5. Text problem 2.46. Remember that Mitra uses the symbol $\ast$ for linear convolution. In the notes, we just use an asterisk “*”.

6. Text problem 2.53. Note: correlation and autocorrelation are described in Section 2.6 of the text. They are like convolution, but without the “flip.”

7. Text problem 4.3. Note: for Part (c), the I/O relation should read:

$$y[n] = \ln(1 + |x[n]|).$$

9. Text problem 4.30. **Note:** for part (b), there is no general closed form solution for $h[n]$ in the time domain. Use the $z$-transform to find $H(z)$ and then simply write down that $h[n] = Z^{-1}[H(z)]$ (you cannot actually compute this inverse $z$-transform because you don’t have explicit expressions for $h_1[n]$ through $h_5[n]$).

**DUE: 9/26/2018 (in class)**