ECE 212 Sample Final

1. Find the DTFS coefficients of the following signal.
   \[ x[n] = 1 + \sin(n\pi/12 + 3\pi/8) \]

2. Determine the FS representation of \( x(t) = 2\sin(2\pi t - 3) + \sin(6\pi t) \)

3. \( x[n] = u[n-1] - u[-n-1] \) Find the DTFT of \( x[n] \).

4. Find the Fourier transform of \( x(t) = e^{2t}u(-t) \). What is the magnitude and phase spectrum of the signal \( x(t) \).

5. Find the FT for the following signals, and draw them.
   a) \( x(t) = |\sin(\pi t)| \)
   b) \( x[n] = 2\cos(3\pi n/8 + \pi/3) + 4\sin(\pi n/2) \)

6. What is the FT of the following signals in terms of the FT of \( x[n] \).
   a) \( x[n-n_0] \)
   b) \( x[2n] \)
   c) \( nx[n] \)

7. \( x[n] = a^n u[n], \quad 0 \leq n \leq 5; \quad |a| < 1 \) the FT of the following signals.
   a) \( x[n] \)
   b) \( y[n] = \sum_{k=-\infty}^{\infty} x[n - 5k] \)

8. Find the Z transform of the following signal in terms of \( X(z) \) which is the Z transform of \( x[n] \).
   a) \( nx[n-5] \)
   b) \( x[n]u[n-1] \)