

## PROBLEM:

Define a discrete-time sinusoidal signal  $x[n]$  that has the following characteristics:

- Its period is 44 samples
  - Its maximum amplitude of 10 occurs at  $n = 11$
- (a) Since  $x[n]$  is a sinusoid, write a simple algebraic formula for  $x[n]$ .
- (b) If  $x[n]$  is used as the input to the following FIR filter:

$$y[n] = x[n] - x[n - 11]$$

then the output  $y[n]$  must also be a sinusoid, so determine the constants  $A$ ,  $\phi$  and  $\omega_0$  in the following formula for  $y[n]$

$$y[n] = A \cos(\omega_0 n + \phi)$$