**EXERCISE 8.8:** Use Euler's relation to represent the signal  $x[n] = A \cos(2\pi k_0 n/N)$  as a sum of two complex exponentials. Assume  $k_0$  is an integer. Use the fact that the DFT is a linear operation and the periodicity of the DFT coefficients to show that its DFT can be written as

$$X[k] = \frac{AN}{2}\delta[k - k_0] + \frac{AN}{2}\delta[k - (N - k_0)] \qquad k = 0, 1, \dots N - 1$$

McClellan, Schafer, and Yoder, *DSP First*, 2e, ISBN 0-13-065562-7. Prentice Hall, Upper Saddle River, NJ 07458. ©2016 Pearson Education, Inc.

