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

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