

EECS20n, Quiz 3 Solution, 10/29/01

The quiz will take 15 minutes. Write your response on the sheet. Use the back if you need more space.

Please print your name here:

Last Name _____ First _____ Lab _____

Consider the discrete-time signal x where

$$\forall n \in \text{Integers}, \quad x(n) = 1 + \cos(4\pi n/9).$$

1. Find the period p , where $p > 0$.

The period is $p = 9$, or any integer multiple of 9.

2. Give the fundamental frequency corresponding to the period in (1). Give the units.

With $p = 9$, the fundamental frequency is $f_0 = 1/9$ cycles/sample, or $\omega_0 = 2\pi/9$ radians/sample.

3. Give the coefficients A_0, A_1, A_2, \dots and ϕ_1, ϕ_2, \dots of the Fourier series expansion for this signal.

With $p = 9$ we get $A_0 = A_2 = 1$, while all other A_i are 0. $\phi_2 = 0$, and all other ϕ_i are arbitrary.