

1.26 (c)  $x[n] = \cos\left(\frac{\pi}{8} n^2\right)$  periodic?

$= x[n+N]$  for all  $n$   $N$  must be integer

$$\cos\left(\frac{\pi}{8} (n+N)^2\right) = \cos\left(\frac{\pi}{8} n^2 + \underbrace{\frac{2\pi}{8} nN + \frac{\pi}{8} N^2}_{m \cdot 2\pi}\right)$$

$m, \text{ integer}$

$$2\pi \left( n \frac{N}{8} + \frac{N}{16} \cdot N \right)$$

Try  $N=8$

$$2\pi \left( n \frac{8}{8} + \frac{8 \cdot 2 \cdot 4}{16} \right) = 2\pi \underbrace{(n+4)}_{\text{integer}} \quad \checkmark$$

• so period =  $N = 8$

• It's trial and error or educated guess

There's no fixed test for  $\cos(\omega_0 n^2)$