Introduction to DSP: Signals - Assignment

1. Determine which of the following signals are periodic, and find their fundamental period.
   (a) $\cos(0.123\pi n - 0.6\pi)$
   (b) $\sin\left(0.1\pi^2 n\right)$
   (c) $\sin(0.1\pi n) + cos(0.23\pi n + 0.13\pi) + \sin(0.43\pi n)$
   (d) $\exp(-j0.423\pi n)$
   (e) $0.123 \times (n \bmod 10)$
   (f) $\sqrt{2} \times (n \bmod N)^2$

2. Consider a signal $x(t) = \sin(12\pi t + 0.25\pi)$. Find the digital frequency of the signal when $x(t\ rp$ is sampled at the following sampling frequencies.
   (a) $F_s = 50Hz$
   (b) $F_s = 18Hz$
   (c) $F_s = 1Hz$
   (d) $F_s = \sqrt{2}Hz$