Introduction to DSP: Signals - Tutorial

1. Which of the following statements are true? Explain you answers.

   (a) $x(t) = \sin(\omega t)$ is an odd signal.

   (b) $x(t) = \cos(\omega t)$ is an event signal.

   (c) $x(t) = \cos(\omega t + 0.25\pi)$ is an odd signal.

   (d) $x(t) = \cos(\omega t + 0.25\pi)$ is not periodic.

2. Given an example for the following types of signals:

   (a) A vector signal.

   (b) Continuous-time continuous-value signal

   (c) Discrete-time continuous-value signal

   (d) Continuous-time discrete-value signal

   (e) Discrete-time discrete-value signal

3. Find the fundamental period and frequency of the following signals:

(a) $x(t) = \sin\left(t + \sqrt{2}\pi\right)$

(b) $x(t) = \cos(2\pi t) + \sin(\pi t)$

(c) $x(t) = \cos(4\pi t) + \cos(8\pi t)$

(d) $x(t) = \sin(4\pi t) + \sin(13\pi t)$

(e) $x(t) = \sin(2\pi t) + \sin(2t)$

4. Find the fundamental period and frequency of the following signals:

   (a) $x[n] = \sin(0.5n)$

   (b) $x[n] = \cos(\pi n + 0.25\pi)$

   (c) $x[n] = \cos(0.1\pi n) + \cos(0.45\pi n)$

   (d) $x[n] = \sin(0.5\pi n) + \sin(0.5n)$