1.42.
b) Nonperiodic.

c) Periodic:
Fundamental period $T=3$ sec.
As it satisfy the condition
$x(t) = x(t + T)$ for all $t$,

d) Periodic:
Fundamental period = 2 samples (see figure below)

![Fig 1.42b](image)

g) Nonperiodic:
It’s clear from the figure the interval [-1, 1] is flipped and the periodicity was lost.

h) Nonperiodic:
Discrete signals can’t have fractional periods.

$$x[n] = \cos(2n) \Rightarrow N = \frac{2\pi}{\Omega} = \frac{2\pi}{2} = \pi$$

1.45.

Given $N$ as the fundamental period of $x[n]$.

$$N = \frac{2\pi}{\Omega} \Rightarrow \Omega = \frac{2\pi}{N}$$

The average power of $x[n]$ is given in Eq. 1.20 as:

$$P = \frac{1}{N} \sum_{n=0}^{N-1} x^2[n] \quad (1.20)$$

Substitute $x[n]$ and $\Omega$,

$$P = \frac{1}{N} \sum_{n=0}^{N-1} x^2[n] = \frac{1}{N} \sum_{n=0}^{N-1} A^2 \cos^2 \left( \frac{2\pi n}{N} + \phi \right)$$
\[
P = \frac{A^2}{N} \sum_{n=0}^{N-1} \cos^2 \left( \frac{2\pi n}{N} + \phi \right)
\]

1.50.
1.52.

a) \( x(t)y(t-1) \)
b) $x(t-1) \, y(-t)$
c) \( x(t+1) y(t-2) \)
d) $x(t) y(-1-t)$
e) \( x(t) y(2-t) \)
f) \( x(2t) y(\frac{1}{2}t+1) \)
g) \( x(4-t) \cdot y(t) \)