2.9) a) $x(n) = \{-4, 5, 1, \underset{\substack{\uparrow \\ n=0}}{-2}, -3, 0, 2\}$. Hence, $x(-n) = \{2, 0, -3, \underset{\uparrow}{-2}, 1, 5, -4\}$

Therefore, $x_{ev}(n) = \frac{1}{2}[x(n) + x(-n)] = \frac{1}{2}\{-2, 5, -2, \underset{\uparrow}{-4}, -2, 5, -2\}$

$= \{-1, 2.5, -1, \underset{\uparrow}{-2}, -1, 2.5, -1\}$

and $x_{odd}(n) = \frac{1}{2}[x(n) - x(-n)] = \{-3, 2.5, 2, \underset{\uparrow}{0}, -2, -2.5, 3\}$

b) $y(n) = \{0, 0, 0, 0, 6, \underset{\uparrow}{-3}, -1, 0, 8, 7, -2\}$. Hence,

$y(-n) = \{-2, 7, 8, 0, -1, \underset{\uparrow}{-3}, 6, 0, 0, 0, 0\}$

Therefore, $y_{ev}(n) = \frac{1}{2}[y(n) + y(-n)] = \{-1, 3.5, 4, 0, 2.5, \underset{\uparrow}{-3}, 2.5, 0, 4, 3.5, -1\}$

and $y_{odd}(n) = \frac{1}{2}[y(n) - y(-n)] = \{1, -3.5, -4, 0, 3.5, \underset{\uparrow}{0}, -3.5, 0, 4, 3.5, -1\}$

c) $w(n) = \{0, 0, 0, 0, 0, 0, 0, 0, \underset{\uparrow}{0}, 0, 3, 2, 2, -1, 0, -2, 5\}$

$w(-n) = \{5, -2, 0, -1, 2, 2, 3, 0, \underset{\uparrow}{0}, 0, 0, 0, 0, 0, 0, 0, 0\}$

$w_{ev}(n) = \frac{1}{2}[w(n) + w(-n)] = \{2.5, -1, 0, -0.5, 1, 1, 1.5, 0, \underset{\uparrow}{0}, 0, 1.5, 1, 1, -0.5, 0, -1, 2.5\}$

$w_{odd}(n) = \frac{1}{2}[w(n) - w(-n)] = \{-2.5, 1, 0, 0.5, -1, -1, -1.5, 0, \underset{\uparrow}{0}, 0, 1.5, 1, 1, -0.5, 0, -1, 2.5\}$

2.15) a) $x(n) = A\alpha^n$ A, α complex with $|\alpha| < 1$.

$|\alpha|^n$ can become arbitrarily large for $n < 0$, $x(n)$ is <u>NOT</u> a bounded sequence.

b) $y(n) = A\alpha^n u(n) = \begin{cases} A\alpha^n & n \geq 0 \\ 0 & n < 0 \end{cases}$ A & α complex with $|\alpha| < 1$.

$|\alpha|^n \leq 1$, $n \geq 0$. Hence, $|y(n)| \leq |A|$ $\forall n$. Then, $y(n)$ is a <u>BOUNDED</u> sequence

c) $h(n) = C\beta^n u(n)$ C & β complex with $|\beta| > 1$.

For $n > 0$, $|\beta|^n$ can become arbitrarily large. Then, $h(n)$ is <u>NOT</u> a bounded sequence

d) $g(n) = 4\cos(\omega_0 n)$. Since $|g(n)| \leq 4$ $\forall n$, $g(n)$ is a <u>BOUNDED</u> sequence.

e) $v(n) = \begin{cases} (1 - \frac{1}{n^2}) & n \geq 1 \\ 0 & n < 0 \end{cases}$ Since, $\frac{1}{n^2} < 1$ for $n > 1$

and $\frac{1}{n^2} = 1$ for $n = 1$, $|v(n)| < 1$ $\forall n$.

Thus, $v(n)$ is a <u>BOUNDED</u> sequence.