EE524 Homework 1-Due 28 August.

1. A discrete–time signal $x(n)$ is shown below.

Match the figures to the appropriate equation:

i. Even part of $x(n)$

ii. $x(4-n)$

iii. $x(n+2)$

iv. $x(n)u(-n+2)$
2. A discrete-time system can have many qualities as shown in the table below. For the two systems given at the top of the table, list whether or not these properties hold.

<table>
<thead>
<tr>
<th>Property</th>
<th>$y(n) = x(n)\cos(\omega_0n)$</th>
<th>$y(n) = \text{round}(x(n))$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time-Invariant?</td>
<td></td>
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<tr>
<td>Causal?</td>
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<tr>
<td>Stable?</td>
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</tbody>
</table>

3. Under what conditions (on the system) does the linear convolution theorem hold? (when does $y[k] = \sum_{n=-\infty}^{\infty} h[k-n]x[n]$), Prove the convolution theorem using linear system theory.

4. Which of the following pictures represent the convolution of: $x = [0,1,1,1,0.5,0.5,0]$, $h = [0,1,1,1,1,1,0]$

![Convolution Pictures](image)

Do the following problems from the textbook:
2.15 a,b
2.25
2.27
2.60
2.64