QUESTION (Textbook/Pr.6.34, p.314):
The following cash flows represent the potential annual savings associated with two different types of production processes, each of which requires an investment of $12,000:

<table>
<thead>
<tr>
<th>n</th>
<th>Process A</th>
<th>Process B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-12,000 $</td>
<td>-12,000 $</td>
</tr>
<tr>
<td>1</td>
<td>9,120 $</td>
<td>6,350 $</td>
</tr>
<tr>
<td>2</td>
<td>6,840 $</td>
<td>6,350 $</td>
</tr>
<tr>
<td>3</td>
<td>4,560 $</td>
<td>6,350 $</td>
</tr>
<tr>
<td>4</td>
<td>2,280 $</td>
<td>6,350 $</td>
</tr>
</tbody>
</table>

Assuming an interest rate of 15%,

a) Determine the equivalent annual savings for each process.
b) Determine the hourly savings for each process if it is in operation 2,000 hours per year.
c) Which process should be selected?
Solution:

a) Apply AE method for each process as follows:

\[ AE(15\%)_A = NPW(15\%)(A/P,15\%,4) \]
\[ AE(15\%)_A = \left[ -12000 + 9120 \left( P/A,15\%,4 \right) - 2280 \left( P/G,15\%,4 \right) \right] \left( A/P,15\%,4 \right) \]
\[ AE(15\%)_A = \left[ -12000 + 9120(2,8550) - 2280(3,7864) \right] \left( 0,3503 \right) \]

Factors from Textbook - Table/p.89 0

\[ AE(15\%)_A = 1893,23\$\text{ (annual equivalent worth of Process A)} \]

\[ AE(15\%)_A = NPW(15\%)(A/P,15\%,4) \]
\[ AE(15\%)_A = \left[ -12000 + 6350 \left( P/A,15\%,4 \right) \right] \left( A/P,15\%,4 \right) \]
\[ AE(15\%)_A = \left[ -12000(0,3503) + 6350(1,0) \right] \]

Factors from Textbook - Table/p.89 0

\[ AE(15\%)_B = 2146,40\$\text{ (annual equivalent worth of Process B)} \]

b) Hourly savings:

\[ \frac{(AE)_A}{hpa} = \frac{1893,23\$/\text{year}}{2000\text{ hours/\text{year}}} = 0,95\ \frac{\$}{h} \]
\[ \frac{(AE)_B}{hpa} = \frac{2146,40\$/\text{year}}{2000\text{ hours/\text{year}}} = 1,07\ \frac{\$}{h} \]

c) \[ \frac{(AE)_B}{hpa} > \frac{(AE)_A}{hpa} \text{; Process B should be selected} \]