Show all work. Each question worth 15 points except where noted.
Do not use a calculator or hand calculations (spreadsheet program only) for precision.

Part A: For the sequence \( \left( 1 + \frac{1}{n} \right)^n \):

1. (20 points) Using technology (any spreadsheet program) make a table of values starting with \( n = 1 \) and going through until your error is less than 0.5% with the following:

<table>
<thead>
<tr>
<th>( n )</th>
<th>( (1+1/n)^n )</th>
<th>% error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>26.4</td>
</tr>
</tbody>
</table>

NOTE: percent error is found with the formula given by

\[
\frac{\text{actual} - \text{estimate}}{\text{actual}} \times 100\%
\]

Here, “actual” would be machine \( e \), which will vary depending on your PC and spreadsheet program.

2. What value of \( n \) do you achieve an error of 0.5% or less?
3. What is your error when to take \( n \) to 400?

Part B: For the recursive sequence with shorthand notation \([a,b; \ n]\) given by

\[
S_0 = a \\
S_1 = b \\
S_n = (2n-1)S_{n-1} + (k-1)^2 S_{n-2}
\]

1. (20 points) Using a spreadsheet program, find \( S_0 \) through \( S_5 \) of the sequences given by \([0,4; \ n]\) and \([1,1; \ n]\)

2. Find the ratios of \( \frac{[0,4; \ n]}{[1,1; \ n]} \) for \( n = 3 \) through \( n = 6 \)

3. Find the percent error for each \( n \) value (above) with machine \( \pi \)