

# Integrating Nonelementary Functions Project Assessment

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## Project Report Criteria and Rubric

### Introduction

Describe the general type of integral you are evaluating, the specific integral you are solving, what methods you used to solve the integral, and why it is necessary to sometimes solve integrals numerically.

### Analysis

Explain the two different ways used to evaluate the integral and show how the error is calculated for each method. Explain the MATLAB algorithm used to implement Simpson's Rule. Describe how you determined the exact value for the integral.

### Discussion and Results

Describe the results you obtained using different values of  $n$  in Simpson's Rule, and different Taylor polynomials. Comment on how the value of  $n$  you predicted would be needed compares to the actual value of  $n$  needed to achieve the specified accuracy. If it is not what you expected, explain why.

### Conclusion

Summarize the most important findings from your work. Describe any questions that may have arose while working on the project, that could have been pursued if there was more time,

### Appendix

List the MATLAB code (properly commented) to find the exact value of the integral, and the approximate value using Simpson's Rule and Taylor polynomials.

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Criteria & Points Assigned	Missing 0	Unacceptable 1	Below Expectations 2	Meets Expectations 3	Exceeds Expectations 4
<b>Introduction (5%)</b>	<ul style="list-style-type: none"> <li>No introduction.</li> </ul>	<ul style="list-style-type: none"> <li>Leaves out several items describing the overall project.</li> </ul>	<ul style="list-style-type: none"> <li>Leaves out one or two items describing the project.</li> </ul>	<ul style="list-style-type: none"> <li>Provides a clear description of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Discusses application of integral.</li> </ul>
<b>Analysis (40%)</b>	<ul style="list-style-type: none"> <li>Does not describe procedure for calculating the error bound.</li> </ul>	<ul style="list-style-type: none"> <li>Describes method for calculating the error bound, but with major errors. Does not describe two ways to evaluate integral.</li> </ul>	<ul style="list-style-type: none"> <li>Adequately describes error bounds and integration methods, but with minor errors. Does not explain the algorithm to evaluate Simpson's Rule.</li> </ul>	<ul style="list-style-type: none"> <li>Accurately describes error bounds, methods for calculating integrals, and the algorithm to evaluate Simpson's Rule.</li> </ul>	<ul style="list-style-type: none"> <li>Provides extra information related to the project. (i.e., explains how a different algorithm works to implement Simpson's Rule.)</li> </ul>
<b>Discussion and Results (30%)</b>	<ul style="list-style-type: none"> <li>No discussion and no results.</li> </ul>	<ul style="list-style-type: none"> <li>Results are presented with no discussion</li> </ul>	<ul style="list-style-type: none"> <li>Discussion is superficial and does not address the stated objective, or there may be errors in the reasoning.</li> </ul>	<ul style="list-style-type: none"> <li>Discussion demonstrates an understanding of the problem, with possibly a few minor errors.</li> </ul>	<ul style="list-style-type: none"> <li>Discussion demonstrates a high level of understanding of the problem.</li> </ul>
<b>Conclusion (5%)</b>	<ul style="list-style-type: none"> <li>No conclusion</li> </ul>	<ul style="list-style-type: none"> <li>Conclusion does not summarize main findings.</li> </ul>	<ul style="list-style-type: none"> <li>Minor errors in the conclusion.</li> </ul>	<ul style="list-style-type: none"> <li>Clearly summarizes project.</li> </ul>	<ul style="list-style-type: none"> <li>Discusses ways to extend the project.</li> </ul>
<b>Appendix (10%)</b>	<ul style="list-style-type: none"> <li>No appendix</li> </ul>	<ul style="list-style-type: none"> <li>Errors in code.</li> </ul>	<ul style="list-style-type: none"> <li>Code is not completely commented.</li> </ul>	<ul style="list-style-type: none"> <li>Code is completely commented and easy to read.</li> </ul>	<ul style="list-style-type: none"> <li>Header is added to each script file describing the purpose and input required to run code.</li> </ul>
<b>Style and Mechanics (10%)</b>	<ul style="list-style-type: none"> <li>No narrative describing project. Sections are not identified.</li> </ul>	<ul style="list-style-type: none"> <li>Writing interferes with comprehension. Some of the required sections are missing or lacking text.</li> </ul>	<ul style="list-style-type: none"> <li>Occasional awkward sentences and poor transitions reduce readability. Tables not correctly labeled and/or referenced in text.</li> </ul>	<ul style="list-style-type: none"> <li>Infrequent and minor mechanical problems. Errors do not impair readability.</li> </ul>	<ul style="list-style-type: none"> <li>Clear and logical presentation. No problems with spelling, punctuation, or grammar.</li> </ul>

