Discussion 1: April 6th, 2017

Instructions: The class is split into groups of 3 students; the TA will have a list of the groups. As a group, you will answer several questions, one of which will be turned in for credit. You will each have an assigned role in your group. The roles are:

1. Manager - Keep your group “on-track.” Make sure everyone participates. Watch the time spent on each problem.
2. Skeptic - Help your group avoid coming to agreement too quickly. Make sure all possibilities are explored. Suggest alternative ideas.
3. Recorder/checker - Act as a scribe for your group. Check for understanding from all group members. Make sure all group members agree. Turn in the assignment to Gradescope and make sure all group member names are included in Gradescope!
4. (If a 4th student) Energizer/summarizer - Energize your group when motivation is low by suggesting a new idea, using humor or being enthusiastic. Summarize your group’s discussion and conclusions.

The front of this sheet contains question(s) that you will not turn in. The back of this sheet contains one question that you will turn in. That question will be graded half as participation points. Solutions for that question will be posted on the course website.

As a group, complete the question(s) that will not be turned in first. Your TA will confirm that you have the correct answer, and will initial that on the back of your group sheet. Once you have that, work on the question that will be turned in. The recorder will write the group’s answer on the back of this sheet, then will take a photo of it to turn it into Gradescope. Submitting this is like submitting homework, but you will be able to add additional students to your submission, after you upload the photo. Make sure to add all students in your group in Gradescope so they get credit! Then, spend a few minutes as a group discussing how your group work went: what went well and what you each could do better next time. (Be polite.) Once you are done, you may continue to work on homework questions, or you may leave.

1. The following table represents the velocities of a bullet leaving a rifle. How far does the bullet travel over the first second? (These are realistic numbers for a .308 caliber bullet, a common rifle bullet. Your estimates may differ some depending on how you do the calculation.)

<table>
<thead>
<tr>
<th>time (s)</th>
<th>0</th>
<th>0.2</th>
<th>0.4</th>
<th>0.6</th>
<th>0.8</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>velocity (m/s)</td>
<td>940</td>
<td>825</td>
<td>735</td>
<td>660</td>
<td>590</td>
<td>540</td>
</tr>
</tbody>
</table>

2. Review: Calculate derivatives of the following functions.

(a) \( f(x) = e^x \)
(b) \( g(x) = \cos(x^2) \)
(c) \( h(x) = \ln(x) \)
(d) \( i(x) = xe^x \)
(e) \( j(x) = e^x / x \)
Discussion 1: Question to be turned in.

Names: 1. ______________ 2. ______________ 3. ______________ 4. ______________

TA initial: ______________

1. Use the graphed velocity curve to explain why estimating the area under the curve with rectangles also estimates the total distance traveled. (The vertical axis is in m/s and horizontal axis is in seconds.)