Orals - MATA14/MATA21 - Fall 2019

To be allowed to do an oral exam, you need at least 20 points on the written exam (bonus points included). For instructions on how to sign up, see the Canvas course page (there should be a recent course announcement about this).

The oral exam usually lasts 1 hour and is structured according to the description below. The purpose of the oral exam is to figure out if you have a very good understanding of the contents of the course. In particular, this means that the results of your written exam will be taken into account on the oral exams.

On the oral exam you can get either the grade G (pass) or VG (pass with distinction). On the oral exam you can get 0 to 6 points. The number of points required to get the grade VG is based on your performance on the written exam as follows:

<table>
<thead>
<tr>
<th>Points on written exam</th>
<th>Oral exam points for VG</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 - 22</td>
<td>6</td>
</tr>
<tr>
<td>23 - 27</td>
<td>5</td>
</tr>
<tr>
<td>28 - 30</td>
<td>4</td>
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</tbody>
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We now describe the two parts of the oral exam.

**Part 1 (2 of 6 points):** As the first part of the oral exam, you get to choose one of the following results which you are then to present on a blackboard with a full proof. This means that you have the opportunity to prepare our presentation ahead of time. Note that any exercise in the lecture notes that relate to the proof may be discussed in relation to this to test your understanding (references to the results and the most relevant exercises are listed below).

- "Balloon" Lemma (3.44, 4.61, 4.62).
- The Multiplication Rule for Limits (4.21(ii), 4.58, 4.59).
- The Squeeze Theorem (4.21(iv), 4.57).
- The Limit Comparison Test (4.65, 4.69, 4.70).
- Change of Variables for Limits (5.27(v'), 5.32, 5.33).

**Part 2 (4 of 6 points):** In the second part of the oral exam, you will be asked to state and prove one of the following results. This means that you
need to prepare all of these results, and their complete proofs, ahead of time. As in the first part, any exercise in the lecture notes that is given in relation to the proof may be brought up for discussion to test your understanding (references to the results and the most relevant exercises are listed below).

- **Mean Value Theorem** (8.2, 8.3, 8.4, 8.5, 8.44, 8.45, 8.46).
- **Bolzano-Weierstrass’ Theorem** (8.57, 8.59, 8.60, 8.62).
- **Fundamental Theorem of Calculus** (10.30, 10.36).
- **Continuous functions are Darboux integrable** (10.51, 10.54, 10.55, 10.57, 10.58, 10.60).
- **Taylor’s Theorem with various error terms** (11.17, 11.20, 11.24, 11.29, 11.32, 11.33, 11.34 – note that the "proof for Proposition 11.24, revisited" on page 454-455 is central).
  - Comment: When discussing Taylor’s formula, we usually focus on the proof for the Lagrange error term.