

- The final project will account for 25% of your course grade.
- Groups of three students each will work on one of the final projects listed below. You must work with other students than the ones you worked with for the student presentation.
- Deliverables consist of a complete written solution (target length: five pages) and a 15-minute presentation. The paper does not need to be typeset if the handwriting is legible.
- The projects will be presented during the final exam period on **Thursday, December 9, 16:00–18:45**. The accompanying papers are due before the start of the presentations.
- The student group will be graded as a group. All group members must contribute to both the written solution and the presentation in equal parts. If members of a group feel that one member is not contributing in a meaningful way, they can ask me to remove the particular student from their group.
- The group will be graded foremost on the mathematical correctness and mathematical clarity of their solution. Other criteria include the quality and completeness of the written report, the quality of the group presentation, making effective use of the allotted time, and staying within the time frame of 15 minutes for the oral presentation.
- Projects will be assigned on **Thursday, November 4**.

Projects:

(The numbers refer to end-of chapter projects.)

1. Quaternary system - State and prove theorems for numbers in base 4 corresponding to the theorems in Section 2.1.3.
2. Countability of algebraic numbers (2.2)
3. Stereographic projection (2.8)
4. An introduction to quaternions (definition, interpretation as complex 2×2 matrices, non-commutativity, conjugates, inverses)
5. Leibniz segments¹ (3.1 and 3.2)

¹Requires knowledge of geometry software such as *Geometer's Sketchpad* or *GeoGebra*.

6. n th differences and polynomial functions (3.5; see also Section 3.3.2)
7. Limit definitions for the number e (3.6)
8. Cardano-Tartaglia method for solving cubic equations (2.5)
9. Ferrari's method to solve quartic equations (4.4)
10. Newton's method² (4.6)

Project	Name 1	Name 2	Name 3
1	Belinda	Diana	Jesus
2	Carla	Gary	James
4	Adriana	Carolina	Paul
5	Chris	Edgar	Miles
7	Belen	Mark	Robin
8	Dorian	Rachel	Stephanie
9	Alberto	Maria	Vanessa
10	Daniel	Sandra	Sheila

²Requires use of a spreadsheet program or a computer algebra system.