



INVERSIVE GEOMETRY

Introduction To Inversive Geometry In The Real Plane Course Syllabus

The total of 44 theorems and 29 problems spread over 29 episodes:

- 9 lectures
- 9 seminars
- 10 practice sessions
- 1 “From Here”, closing, episode

Theory

Episode 1. Lecture 1. Goals, Prerequisites, Road map.

Episode 2. Lecture 2. Motivation, Definitions, Terminology.

Episode 3. Lecture 3. Points, Part 1 Of 2. Theorems 1 - 5, Problems 1 - 5.

Episode 4. Lecture 4. Points, Part 2 Of 2. Theorems 6 - 8, Problems 6 - 9.

Episode 5. Lecture 5. Straight Lines. Theorems 9 - 14.

Episode 6. Lecture 6. Circles, Part 1 Of 2. Theorems 15 - 23.

Episode 7. Lecture 7. Circles, Part 2 Of 2. Theorems 24 - 31.

Episode 8. Lecture 8. Angles. Theorems 32 - 36.

Episode 9. Lecture 9. Tangency, Power, Radical Axis. Theorems 37 - 44. Problem 10.

Problem Solving

Episode 10. Seminar 1. Basic Approach. Tangent Circles. Problem 11.

Episode 11. Seminar 2. Tangent Circles. Problem 12, 2 Circles + 1 Point.

Episode 12. Seminar 3. Tangent Circles. Problem 13, 3 Intersecting Circles.

Episode 13. Seminar 4. Tangent Circles. Problem 14, The Apollonius 3-Circle Problem.

Episode 14. Seminar 5. Orthogonal Circles. Problem 15, 1 Circle + 2 Points.

Episode 15. Seminar 6. Orthogonal Circles. Problem 16, 2 Circles + 1 Point.

Episode 16. Seminar 7. Orthogonal Circles. Problem 17, Inversion Into Concentric Circles.

Episode 17. Seminar 8. Mixed Problems. Problem 18, Chain Of Pappus.

Episode 18. Seminar 9. Mixed Problems. Problem 19, An Arbelos Encounter.

Practice

Episode 19. Practice 1. Problem 20. Four Pairwise Externally Tangent Circles.

Episode 20. Practice 2. Problem 21. Inversion Meets A Recurrence Relation.

Episode 21. Practice 3. Problem 22. Inversion And Alternative Reasoning.

Episode 22. Practice 4. Problem 23. Inversion And Verbal College Entrance Exams.

Episode 23. Practice 5. Problem 24. Inversion And New Proofs Of Existing Theorems.

Episode 24. Practice 6. Problem 25. Inversion In Real Life: Peaucellier-Lipkin Linkage.

Episode 25. Practice 7. Problem 26. Inversion Meets Sangaku, From Japan With Love.

Episode 26. Practice 8. Problem 27. A Circle In A Circular Segment.

Episode 27. Practice 9. Problem 28. Intersecting A Given Circle, With Constraints.

Episode 28. Practice 10. Problem 29. Tea For Two and Two For Tea.

Epilogue And Farewell

Episode 29. The “From Here” Directions. Pencils Of Circles. Inversion In The Complex Plane. Inversion Of The Space In A Sphere. Inversion Of The Plane In Conical Sections (Hyperbola, Parabola And Ellipse).