

Rules for the final test:

1. Closed book, closed notes, bring ruler and compass.
2. There will be 8 problems; you will have 120 minutes to solve them.

Material to be covered:

I1–I36, I38–I40.

C1–C8, C15–C21

P1–P11, P13, P15, P16, although the exam will not cover the 3-dimensional space.

Here is the more detailed list of subjects, although some minor subjects are omitted in the list:

1. From I-sections:

Z-principle, principle of vertical angles, congruence/similarity conditions for triangles: SSS, SAS, ASA. Proportionality of segments cut out by parallel lines. Area of triangle, sum of angles of triangles and of general polygons. N-E-S-W walk in the plane.

Concurrence theorems for triangles, relation between inscribed and central angle in the circle, chords in a circle and their properties, degree and trigonometry, sine and cosine law with application to area. Definition of the cross-ratio.

Regular polygons and inscribed/circumscribed circles for polygons.

Definition of lines and angles on the sphere and on the hyperbolic plane. Excess/deficit formulae for areas of triangles (without proofs). Why 5-th postulate (existence and uniqueness of a line parallel to the given one and passing through the given point) fails for these geometries.

2. From P-sections:

Distances on the line, classification of motions of the line.

Distances in the plane, motions of the plane and their classification ( $e^{i\alpha}z + t$ ,  $e^{i\alpha}\bar{z} + t$ ), how to find motions which move given pair of points to another pair of points.

Triangle inequality (in the plane only): You can follow either proofs from the textbook or from the notes.

Lines in the plane, parallel lines, existence and uniqueness of a line through two distinct points, uniqueness and existence of a line parallel to the given line and passing through the given point.

3. From C-sections:

Copying triangles and angles, drawing parallels and perpendiculars, drawing side and angle bisectors, adding, subtracting and multiplying numbers via compass and ruler. Computing  $\sqrt{x}$  via compass and ruler. Constructing parallelograms, equilateral triangles and squares. Constructing a circle through given three points.

Explain your constructions: what and how you do!