

Combinatorics and Ruler & Compass Constructions

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Problem 1.

You are given a balance scale and a weight of 1 gram. Can you use them to measure out 1 kilogram of sugar by using the scale at most 10 times?

Problem 2.

There are 68 coins on the table, and any two coins weight differently. Show how to determine the heaviest and the lightest coins using a balance scale at most 100 times.

Problem 3.

a) Given a segment AB on the plane, construct a point C such that ABC is an equilateral triangle using the ruler and compass.

b) Construct the midpoint of the segment AB .

Problem 4.

Given a point A and two rays out of it forming an angle α , construct the angle bisector of α .