

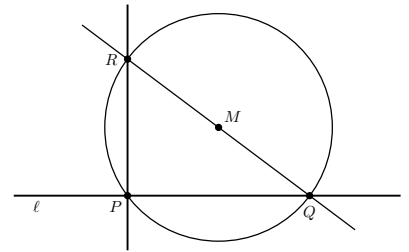
Problemen

| Problem Section

The deadline for solutions to the problems in this edition is December 1st, 2010.

All three problems ask for a construction with ruler and compass in a limited number of steps. More precisely, given a collection of points, lines, and circles in the plane, a *move* consists of adding to the collection either a line through two of the points, or a circle centered at one of them and passing through another. At any time one is allowed to freely add any intersection point among the lines and circles, as well as any sufficiently general point, either in the plane, or on any of the lines or circles.

For example, given a line ℓ and a point P on ℓ one can construct a line through P and perpendicular to ℓ in three moves as follows. Choose a point M not on ℓ . For the first move, take the circle C centered at M and going through P . Let Q be the second point of intersection between C and ℓ . For the second move, add the line through Q and M and let R be the second point of intersection between this line and C . Finally, add the line PR , which is perpendicular to ℓ .



These problems are inspired by Robin Hartshorne's book *Geometry: Euclid and beyond*.

Problem A

Given a line and distinct points A and B on it, construct in at most four moves the point C between A and B that satisfies $6|AC| = |AB|$.

Problem B

Given a circle, but not its center, construct in at most seven moves an equilateral triangle whose vertices lie on the circle.

Problem C

Construct a square in at most eight moves.

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