

Euclidean Constructions

Axioms

Euclid set out 5 common sense axioms plus 5 geometrical axioms.

The geometry axioms are:

1. There exists a line through points P and Q
2. Line segments can be extended
3. Circles exist
4. All right angles are congruent

Euclidean Constructions

Parallel Postulate

For every line ℓ and point P that does not lie on ℓ , there exists a unique line m through P and parallel to ℓ .

Euclidean Constructions

Construction 1: Perpendicular bisector



Euclidean Constructions

Construction 2: Perpendicular through a point

A



The diagram consists of a single horizontal black line positioned in the lower half of the page. Above the line, centered horizontally, is a small black dot. To the left of the dot is the capital letter 'A'. This represents the starting point of a construction where a perpendicular line must be drawn through point A to the given line.

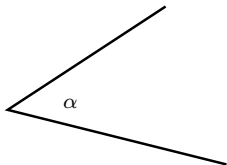
Euclidean Constructions

Construction 2: Perpendicular through a point



Euclidean Constructions

Construction 3: Duplicate an angle



Euclidean Constructions

Construction 4: Parallel lines

A



Euclidean Constructions

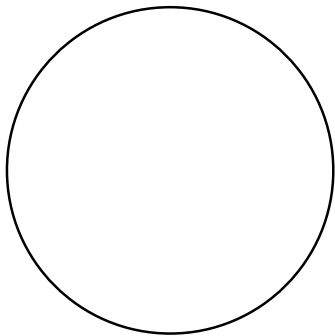
Construction 4: Parallel lines (alternate construction)

A



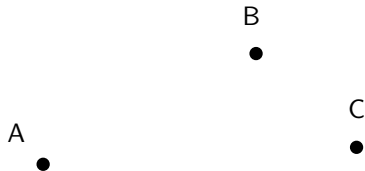
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Construction 5: Center of a circle



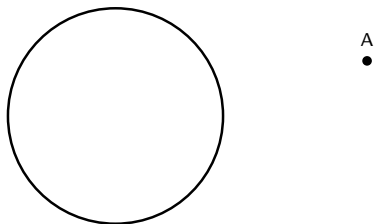
Euclidean Constructions

Construction 5: Center of a circle



Euclidean Constructions

Construction 6: Touching circles



Euclidean Constructions

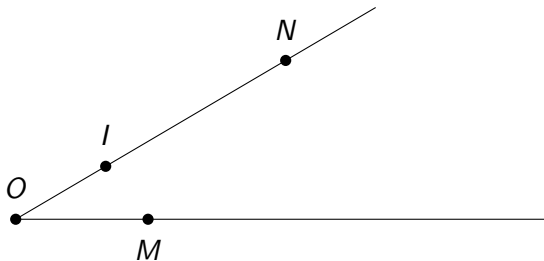
Construction 7: Dividing a line segment into equal parts



Euclidean Constructions

Construction 8: Multiplication of numbers

1 _____
 m _____
 n _____



Euclidean Constructions

3 unsolvable problems

Squaring the Circle

Doubling the Cube

Trisecting an Angle