

Euclidean Constructions – Straight Edge & Compass



5 Common Sense Axioms

- Things that are equal to the same things are equal to one another.
- If equals be added to equals, the wholes are equal.
- If equals be subtracted from equals, the remainders are equal.
- Things that coincide with one another are equal to one another.
- The whole is greater than the part.

5 Geometrical Axioms (*Postulates*)

- There exists a line through distinct points P and Q .
- Line segments can be extended.
- Circles exist.
- All right angles are congruent.

Parallel Postulate

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

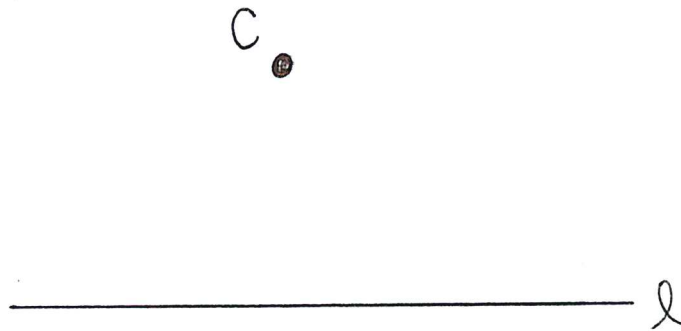
Construction 1: Perpendicular Bisector

Given: AB



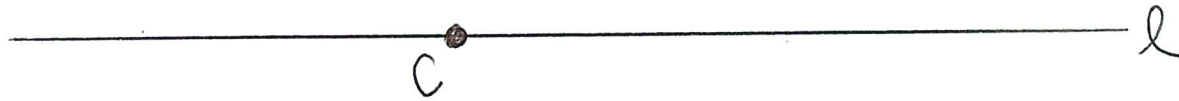
Construction 2: Perpendicular Through A Given Point

Given: l and C



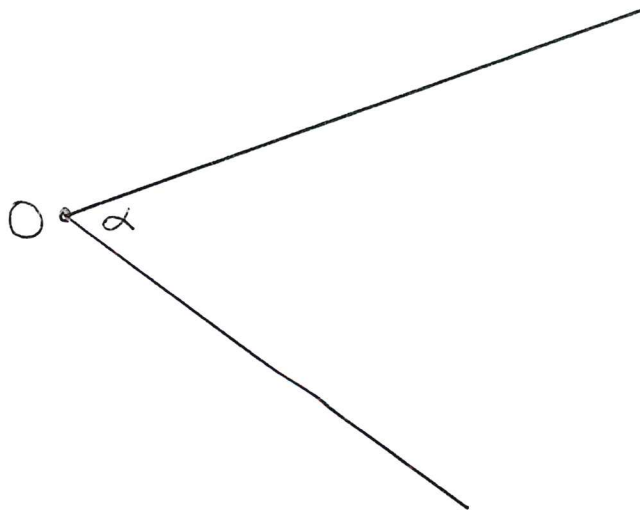
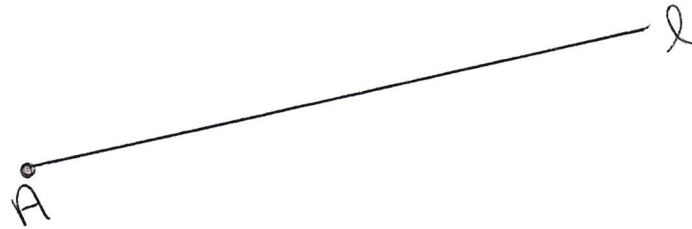
Construction 2: Perpendicular Through A Given Point

Given: l and C



Construction 3: Duplicating An Angle

Given: α , l , A



Construction 4: Drawing A Parallel Line

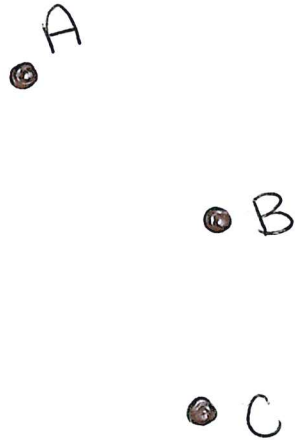
Given: l and A

A •



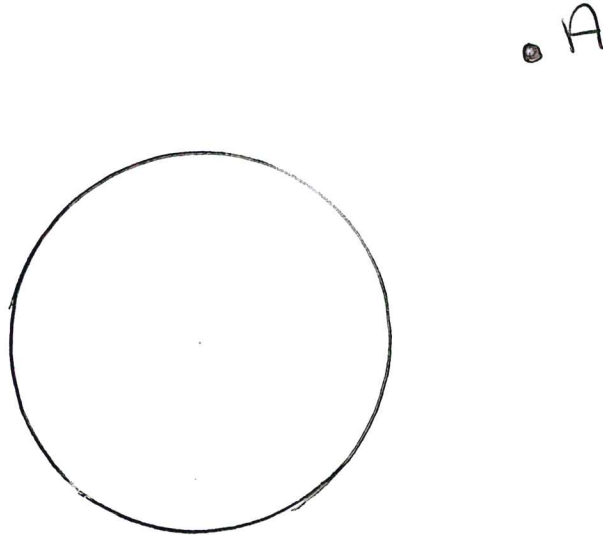
Construction 5: Finding The Center Of A Partially Given Circle

Given: A, B, C (not on same line)



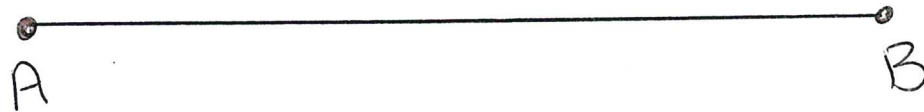
Construction 6: Constructing A Circle Centered At A Given Point, Touching Another Circle

Given: Circle and A



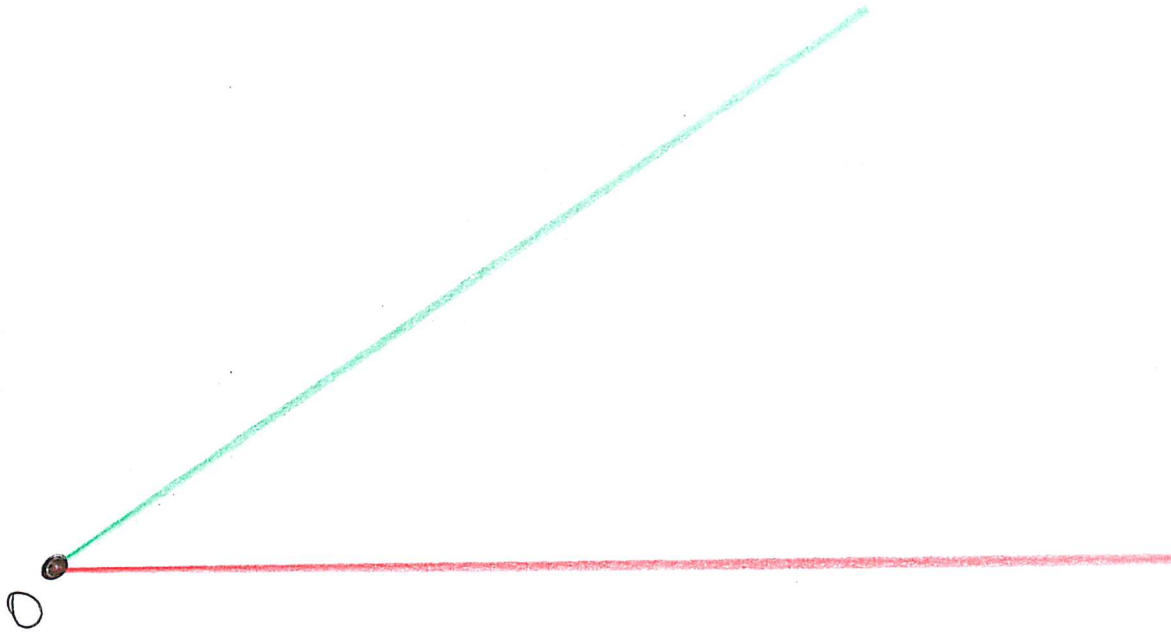
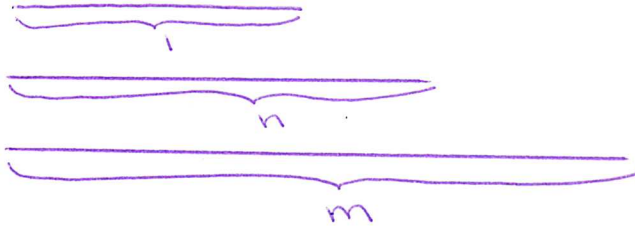
Construction 7: Subdividing A Line Segment Into Equal Parts

Given: AB



Construction 8: Multiplication Of Numbers

Given



Three Unsolvable Problems

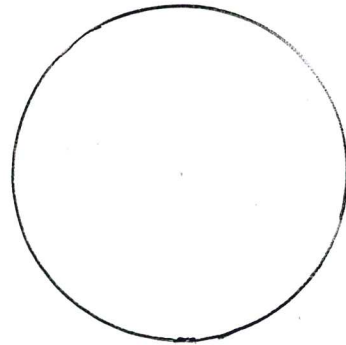
Given

construct

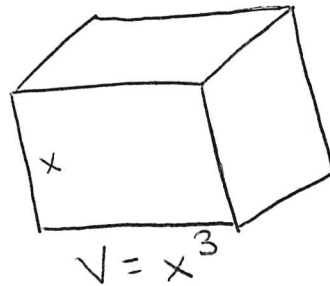


$$A = \pi r^2$$

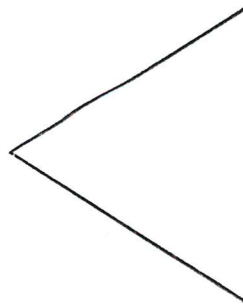
- Squaring a Circle

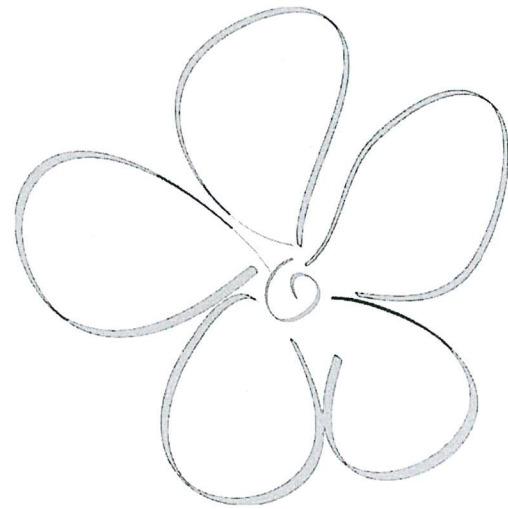


- Doubling a Cube



- Trisecting an Angle





QUESTIONS???