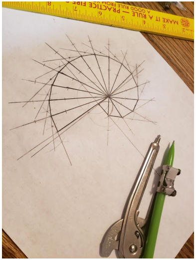
Axiomatic Systems, Measurement, and Constructions

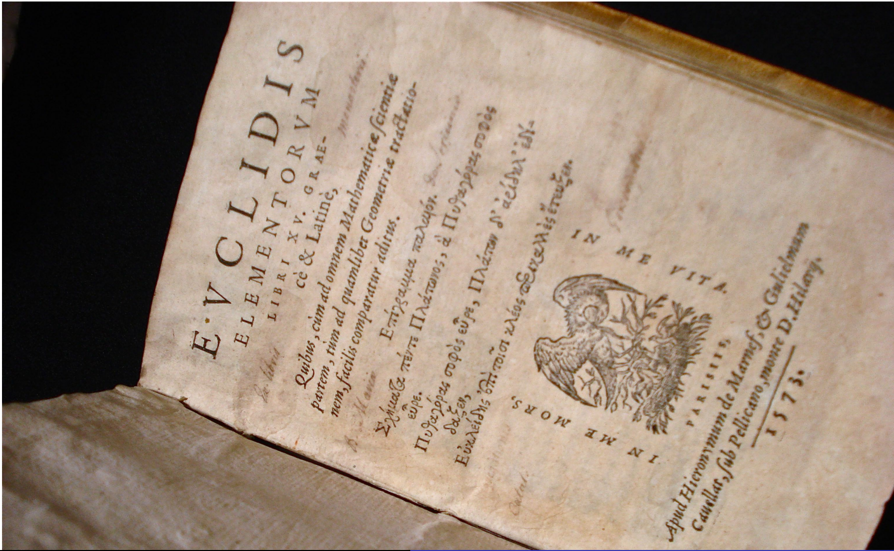
- straightedge and compass
- paper folding—isometries of the plane (linear transformations that preserve length)
- Interactive Geometry Software (IGS) move geometric figure—configuration like the skeletal system of the human body or a mechanical device with interconnected parts, levers, and linkages—preserves dependency relationships to reveal invariants



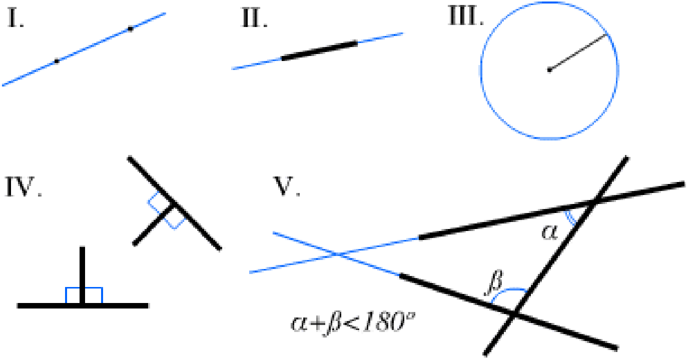
https://www.reddit.com/r/GeometryIsNeat/comments/b4rgv4/a_ruler_and_compass_

Euclid's Elements

CC BY-SA 3.0 *Euclid's Elements* 1573 Edition. Private collection Hector Zenil.



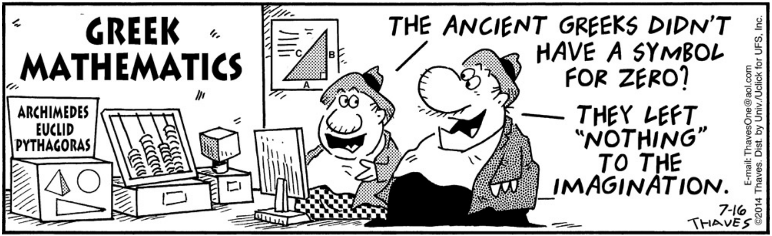
Euclid's Elements Postulates



https://www.storyofmathematics.com/hellenistic_euclid.html

Euclid's Elements I-1

I-1: On a given finite straight line, to construct an equilateral triangle (with only straightedge, compass, and intersection)



Let $\overline{AB}$ be a line segment. We'll construct an equilateral triangle with $\overline{AB}$ as the base...

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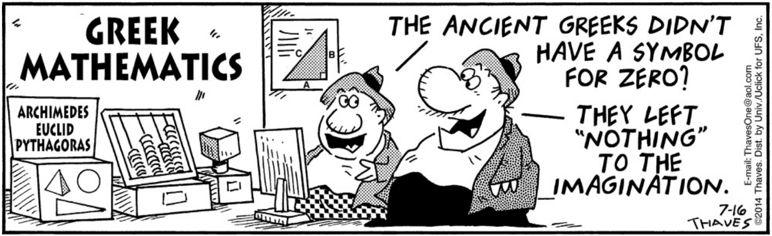

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directly used in I.2, I.9, I.10, I.11

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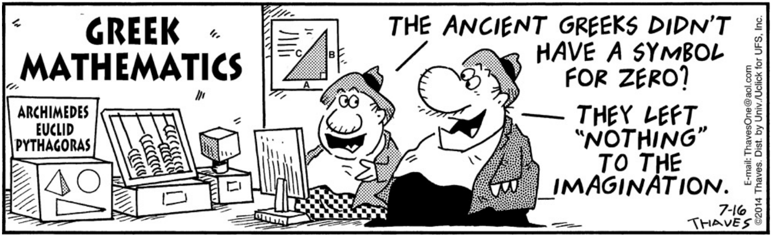

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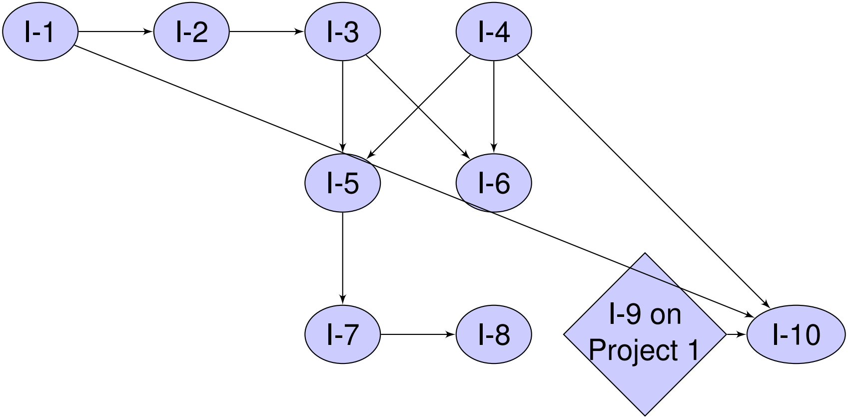
paper folding:
`https://www.youtube.com/watch?v=6dA2R8bLb7Q`

Propositions, Assumptions and Applications

Proof Considerations: I can write rigorous proofs in geometry, identify underlying assumptions, and understand limitations and applications.



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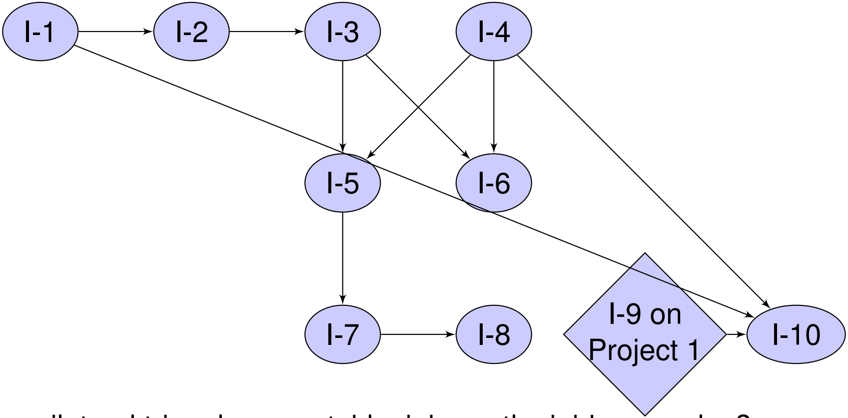

equilateral triangles are stable, inherently rigid, examples?

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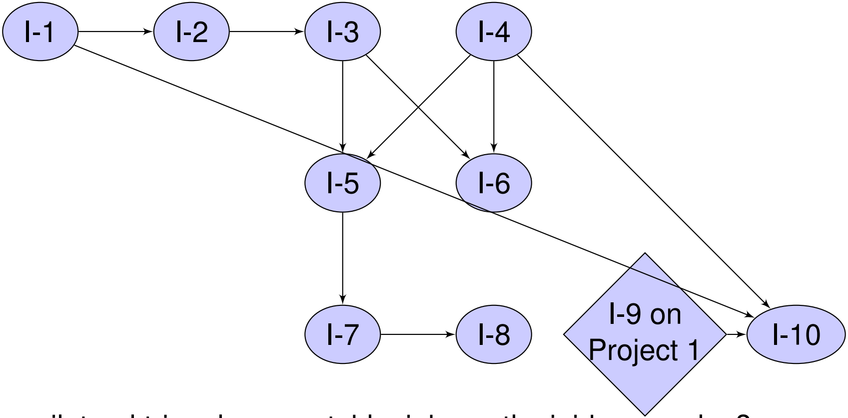

equilateral triangles are stable, inherently rigid, examples? pool table, methane molecule

Euclid's Elements I-11

I-11: To draw a straight line at right angles to a given straight line from a given point on it (with only straightedge, compass, and intersection)

https://i.redd.it/xu89vcweusc11.jpg

Purr-pendicular

directly used in I-13, I-46, and I-48

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engineering, construction, road intersections, Snell's law, Voronoi diagrams, normal force, principal component analysis

Where is North?

Leo Reynolds

I keep having a recurring nightmare where I am trapped in the following axiom system:

- A1: Coyotes and roadrunners live on the surface of a perfectly round planet.
- A2: Coyotes only begin chasing roadrunners exactly 2 seconds after the roadrunner passes them.
- A3: Coyotes can only catch roadrunners if they can catch up to them after having chased them.
- A4: Roadrunners run faster than coyotes.
- A5: Coyotes stop chasing roadrunners when they disappear from view.
- A6: All coyotes have 20/20 vision.

Will I be able to catch the roadrunner? If needed, can you add other axioms to the system, which are consistent with A1 through A6, that will ensure that I will always catch the roadrunner? Help me - you're my only hope!
Hungry as ever, Wile E. Coyote

Euclid's Elements I-10

To bisect a given finite straight line.