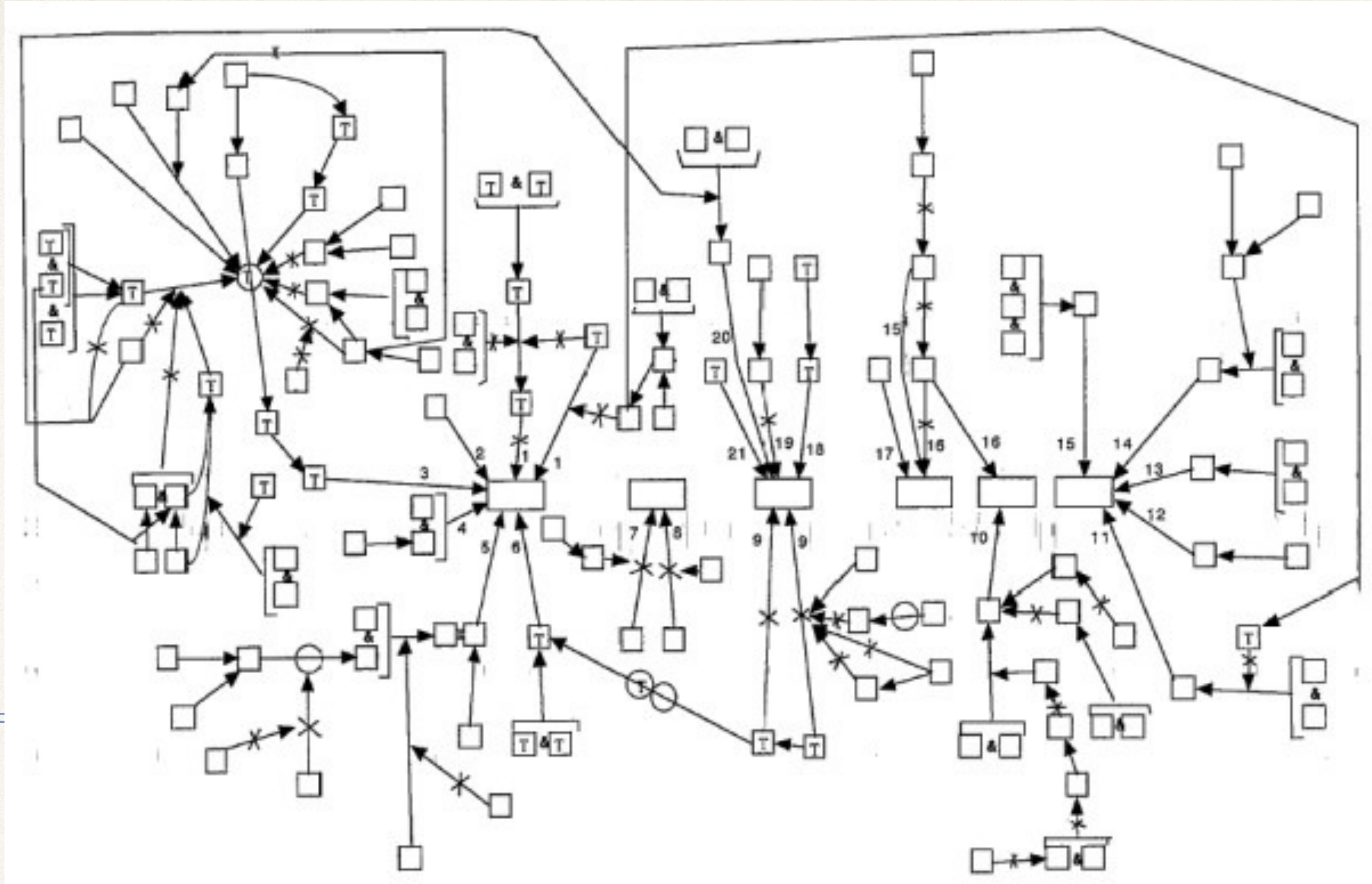
Premises and Conclusion



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Deductive versus Inductive Arguments

What Is an Argument?

An argument is a **series of statements** in which

(1) some of the statements are the **premises**

(2) one of the statements is the **conclusion**

(3) the premises are meant to **support** the conclusion

Example

You are wasting your time. If you are learning old things, you are wasting your time. In college you only learn about old things. You are going to college.

Premise (1): If you are learning old things, you are wasting your time.
Premise (2): In college you only learn about old things.
Premises (3): You are going to college.

Conclusion (C): You are wasting your time.

Example 2

You do not deserve more income than your neighbor. All differences in income between people are a consequence of luck. If you earn more income than your neighbor as a consequence of luck, you do not deserve it. You earn more than you neighbor.

Premise (1): All differences in income between people are a consequence of luck.
Premise (2): If you earn more income than your neighbor as a consequence of luck, you do not deserve it.
Premises (3): You earn more than your neighbor.

Conclusion (C): You do not deserve more income than your neighbor.

What Makes an Argument Good?

- **Reality Check:**

  the *premises* are *true, well-supported* or *agreed upon*

- **Formal Validity:**

  the conclusion *follows from* the premises

What Does it Mean for a Conclusion to **Follow from** the Premises?

- Whenever the premises are true, the conclusion is **always** and **invariably** true. This means that the argument is **deductively valid**.
- Whenever the premises are true, the conclusion is **most likely** or **most probably** true. This means that the argument is **inductively valid**.

A Misunderstanding to Avoid

Whether a **conclusion follows from the premises**—deductively or inductively—has **nothing** to do with the *whether* the **premises are true, plausible etc**.

A conclusion can follow—deductively or inductively—from false or true premises.

For example, from the obviously false premise that the moon is made of cheddar cheese, it follows—deductively—that the moon is made of something that can be eaten.

Let’s See Some Examples

Inductive or Deductive?

Premise: The witness says she saw the defendant around the crime scene at 3:30 PM on Wednesday February 14, 2013.

Conclusion: The defendant was in fact around the crime scene at 3:30 PM on Wednesday February 14, 2013.

Inductive. The conclusion follows only as a matter of probability. The witness might not be telling the truth.

Inductive or Deductive?

Premise: The Moon is either Green or Black.

Premise: The Moon is not Black.

Conclusion: The Moon is Green.

Deductive. The conclusion always follows from the premises. There is no possible situation in which the premises are true and the conclusion is false.

Inductive or Deductive?

Premise: The DNA test shows that the defendant matches with the blood found at the crime scene.

Conclusion: The blood at the crime scene belongs to the defendant.

Inductive. The conclusion follows only as a matter of probability. The DNA test might be wrong.

Inductive or Deductive?

Premise: If the money supply increases, prices go up.

Premise: The money supply in the US is increasing.

Conclusion: Prices in the US will go up.

Deductive

Inductive or Deductive?

Premise: If the money supply increases, prices go up.

Premise: The money supply in the US is not increasing.

Conclusion: Prices will not go up.

The argument is *not deductive*. Prices could still go up even if the money supply does not increase. Maybe the argument is inductive…

Inductive or Deductive?

Premise: If it is raining, the sidewalk gets wet.

Premise: It is not raining.

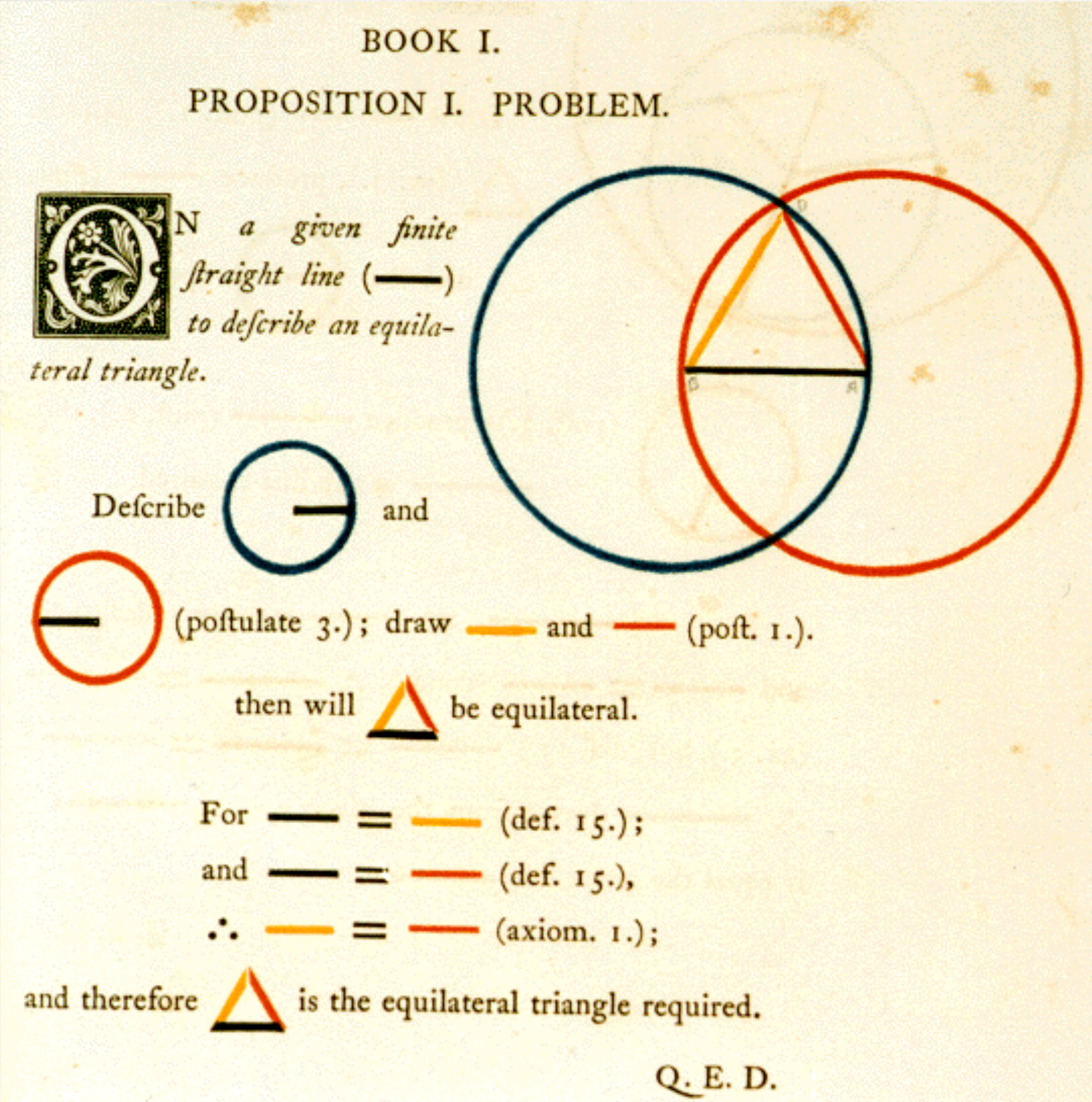
Conclusion: The sidewalk does not get wet.

The argument is *not deductive*. It could be inductive because a plausible reason why the floor is not getting wet is that it is not raining.

An Example of a Deductive Argument in Geometry from Euclids's *Elements*

Euclid's *Elements*

(circa 300 BC)


BOOK I.

PROPOSITION I. PROBLEM.

ON a given finite ſtraight line (——) *to deſcribe an equilateral triangle.*

Deſcribe and

(poſtulate 3.); draw —— and —— (poſt. 1.).

then will be equilateral.

For —— = —— (def. 15.);

and —— = —— (def. 15.),

∴ —— = —— (axiom. 1.);

and therefore is the equilateral triangle required.

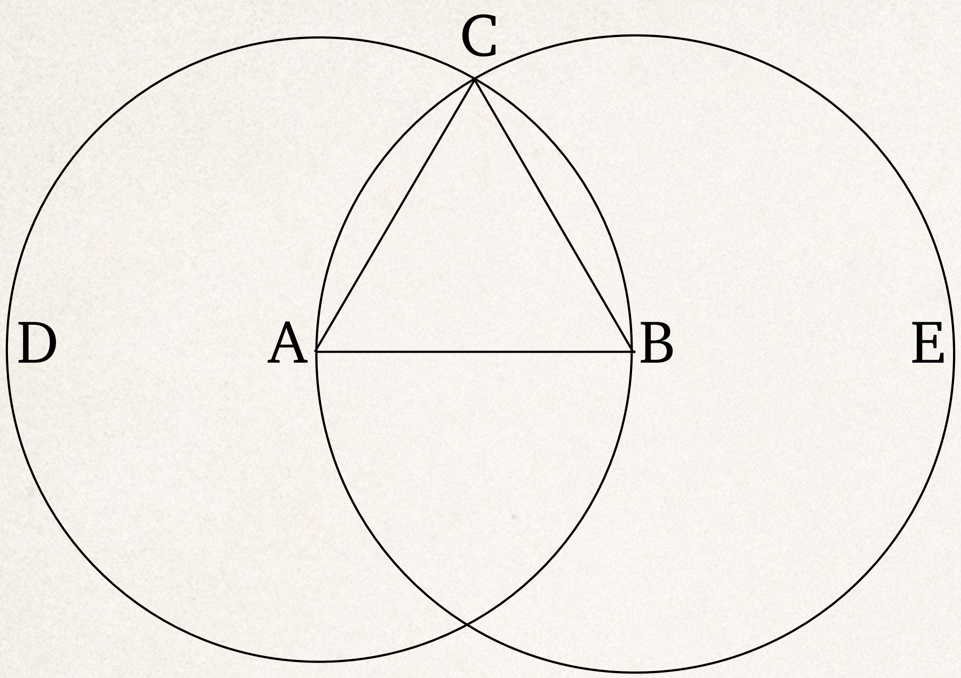
Q. E. D.

Def. 15: A circle is such that all of the straight-lines radiating towards the circumference from one point amongst those lying inside the figure are equal to one another.

Ax. 1 (also called "common notion 1"): Things equal to the same thing are also equal to one another.

Proposition 1

To construct an equilateral triangle on a given finite straight-line.

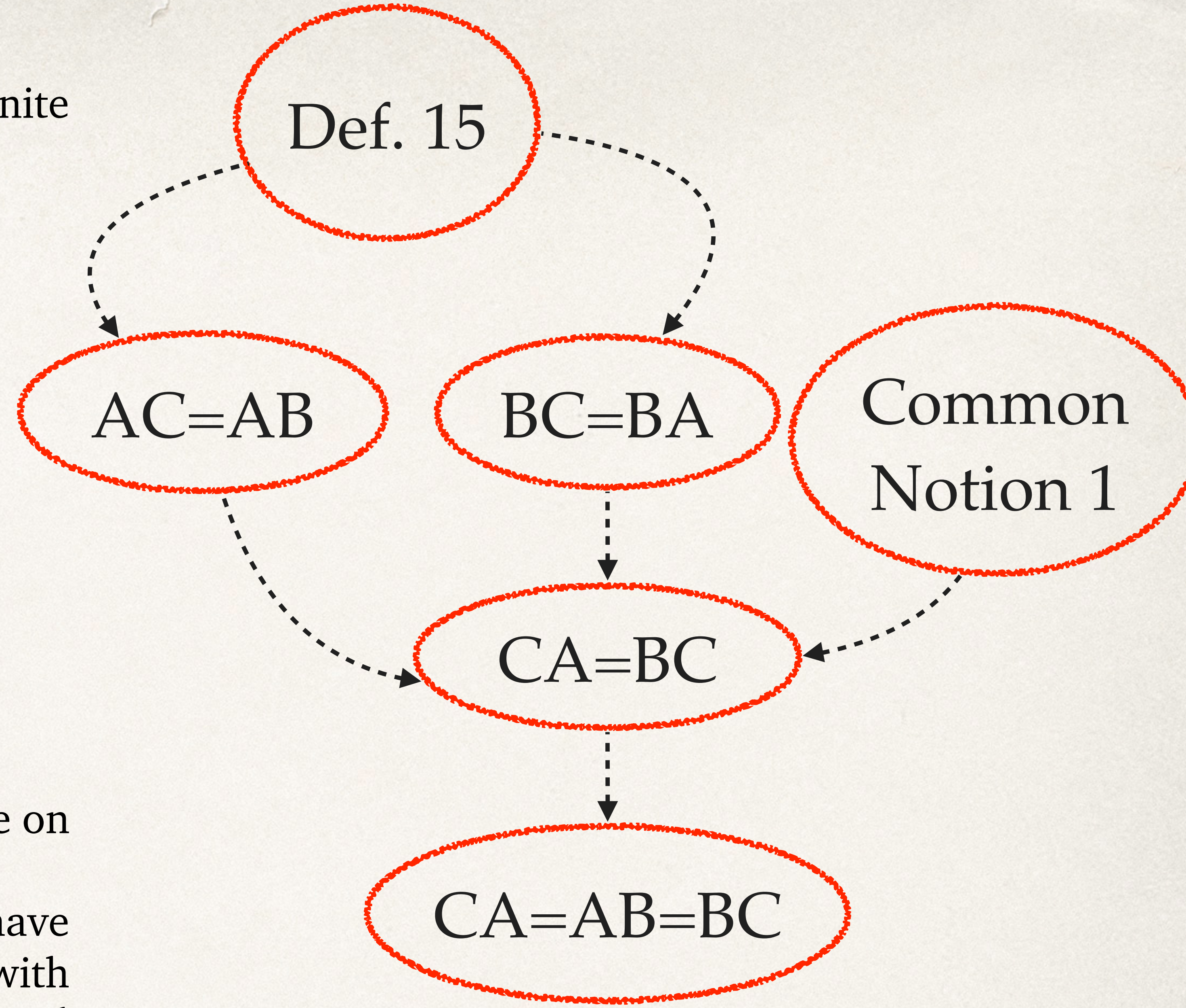


Let AB be the given finite straight-line.

So it is required to construct an equilateral triangle on the straight-line AB.

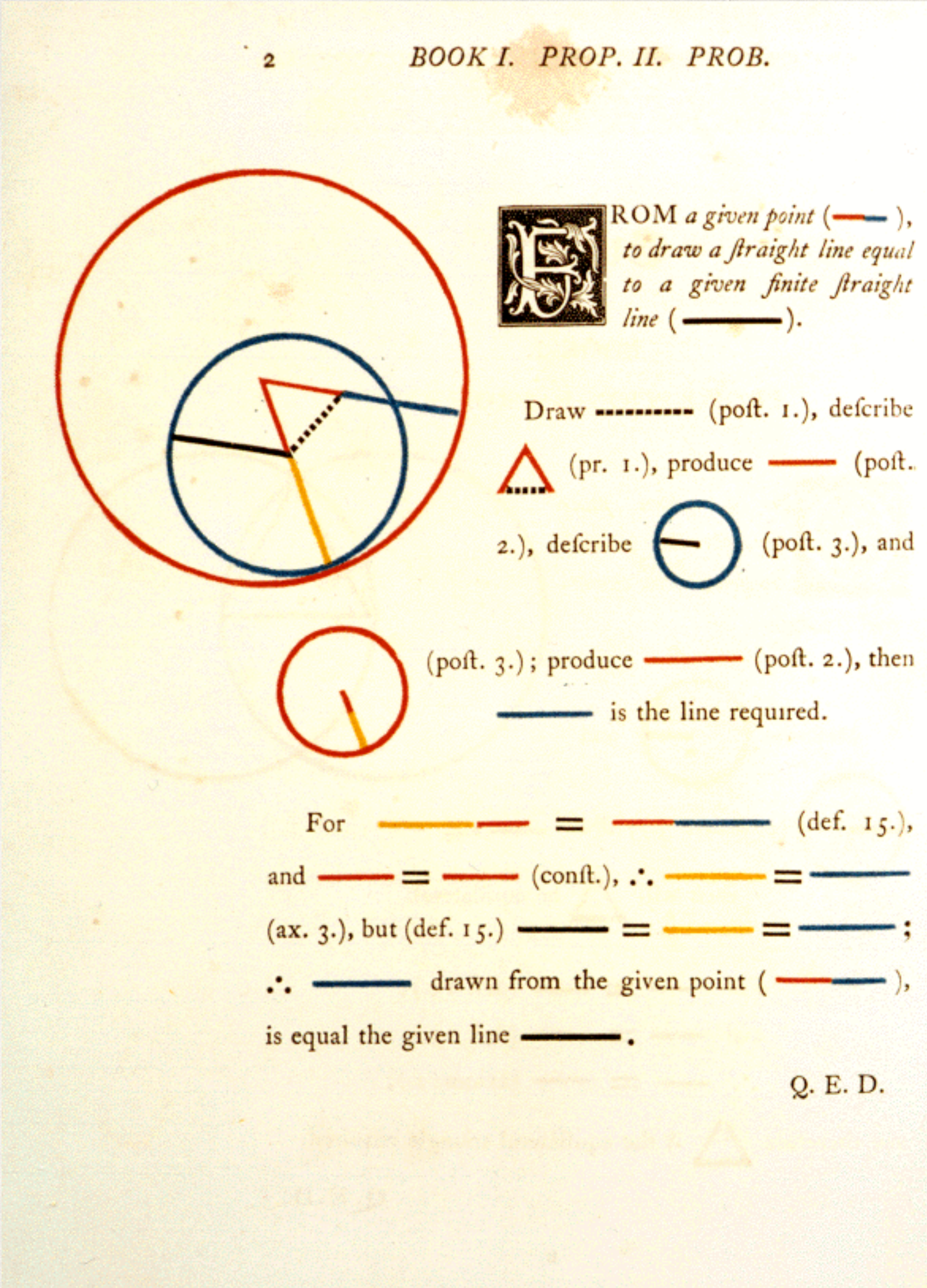
Let the circle BCD with center A and radius AB have been drawn [Post. 3], and again let the circle ACE with center B and radius BA have been drawn [Post. 3]. And let the straight-lines CA and CB have been joined from the point C, where the circles cut one another,† to the points A and B (respectively) [Post. 1].

And since the point A is the center of the circle CDB, AC is equal to AB [Def. 1.15]. Again, since the point B is the center of the circle CAE, BC is equal to BA [Def. 1.15]. But CA was also shown (to be) equal to AB. Thus, CA and CB are each equal to AB. But things equal to the same thing are also equal to one another [C.N. 1]. Thus, CA is also equal to CB. Thus, the three (straight-lines) CA, AB, and BC are equal to one another.



Def. 15: A circle is such that all of the straight-lines radiating towards the circumference from one point amongst those lying inside the figure are equal to one another.

Common Notion 1: Things equal to the same thing are also equal to one another.



FROM *a given point* ( ), *to draw a ſtraight line equal to a given finite ſtraight line* ( ).

Draw (poſt. 1.), deſcribe (pr. 1.), produce (poſt. 2.), deſcribe (poſt. 3.), and (poſt. 3.); produce (poſt. 2.), then is the line required.

For = (def. 15.), and = (conſt.), ∴ = (ax. 3.), but (def. 15.) = = ; ∴ drawn from the given point ( ), is equal the given line .

Q. E. D.

Ax. 3 (also called “common notion 3”): If equals are subtracted from equals, then the remainders are equals.