

## Lesson 3.1 | Constructions as Proof

Unit 3: Proof and Congruence • Student Notes and Check Your Understanding

|                | Drawing | Construction |
|----------------|---------|--------------|
| Tools          |         |              |
| What it shows  |         |              |
| What it proves |         |              |

|                | Postulate | Proposition |
|----------------|-----------|-------------|
| What it is     |           |             |
| How we know it |           |             |
| Example        |           |             |

**Note:** Both words start with “P.” They are not the same thing.

A postulate is \_\_\_\_\_. A proposition is \_\_\_\_\_.

**Proposition 1 (conditional form):** If we are given a line segment, then \_\_\_\_\_.

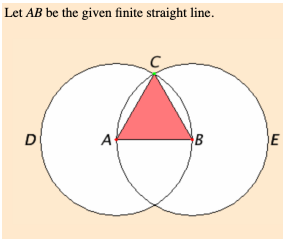


Image taken from: <http://aleph0.clarku.edu/~djoyce/elements/bookI/propI1.html>

| Step | What I did                  | Justification (postulate, common notion, or proposition) |
|------|-----------------------------|----------------------------------------------------------|
| 1    |                             |                                                          |
| 2    |                             |                                                          |
| 3    |                             |                                                          |
| 4    |                             |                                                          |
|      | Why it must be equilateral: |                                                          |

## Proposition 2 — Fill in the Justifications

Euclid's Proposition 2: given a point A and a segment BC located somewhere else, we can construct a segment starting at A equal in length to BC. The construction steps are listed below. Before reading them, look at the diagram and try to figure out what each step is doing. Then fill in each justification.

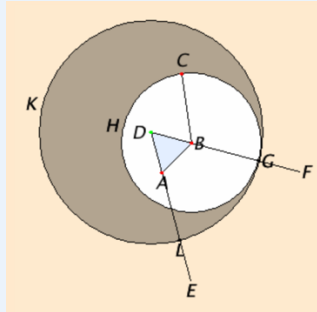


Image taken from:

- (a) Draw segment AB. Justification: \_\_\_\_\_
- (b) Construct an equilateral triangle ABD on segment AB. Justification: \_\_\_\_\_
- (c) Extend lines DA and DB beyond A and B. Justification: \_\_\_\_\_
- (d) Draw a circle centered at B with radius BC. Mark where it meets line DB extended — call this point G. Justification: \_\_\_\_\_
- (e) Draw a circle centered at D with radius DG. Mark where it meets line DA extended — call this point L. Justification: \_\_\_\_\_

**Now explain: why can this construction only work because Proposition 1 was already proven?**