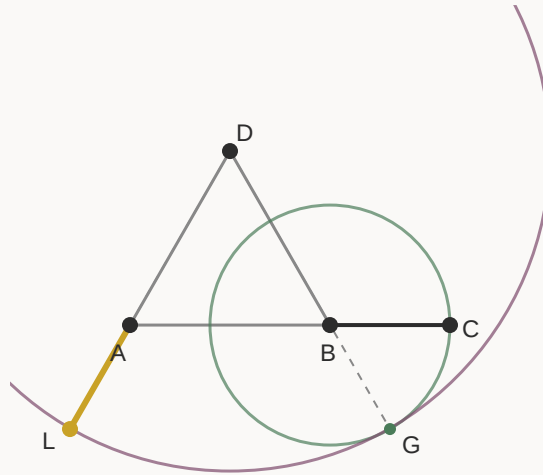


Worksheet: Proposition 2

To place a straight line equal to a given straight line with one end at a given point.



Line BC transferred to point A via triangle and circles; $AL = BC$

Student Name: _____

Date: _____

Part A: Construction Practice

Using only your compass and straightedge, carry out the construction described in Proposition 2. Label all points clearly.



After completing, answer:

1. What tools did you use, and in what order?

2. Which postulates justify each step of your construction?

Part B: Proof Justification

Below is the proof broken into steps. For each step, write the toolkit item that justifies it.

Available Toolkit:

- P1 — Draw a Line
- P2 — Extend a Line
- P3 — Draw a Circle
- Prop 1 — To construct an equilateral triangle on a given finite straight line.
- CN1 — Transitivity of Equality
- CN3 — Subtraction Preserves Equality
- D15 — Circle
- D20 — Types of Triangles (by sides)

Step	Statement	Justification
1	Connect A to B with a straight line	
2	Construct equilateral triangle DAB on line AB, giving $DA = DB = AB$	
3	Extend DA beyond A, and extend DB beyond B	
4	Draw circle centered at B with radius BC — mark G where it crosses DB extended.	
5	Because G lies on the circle centered at B, $BG = BC$.	
6	Draw circle centered at D with radius DG — mark L where it crosses DA extended.	
7	Because L lies on the circle centered at D, $DL = DG$.	
8	$DL = DG$, with $DL = DA + AL$ and $DG = DB + BG$. Since $DA = DB$, the remainders are equal: $AL = BG$.	
9	$AL = BG$ and $BG = BC$, therefore $AL = BC$.	

Part C: Thinking Deeper

Question 1: Look at Postulate 3: what operation does it actually permit? Why doesn't it directly allow copying a length?

Question 2: How does the equilateral triangle help us transfer the length?

Question 3: What does this proposition tell us about the power of Euclid's postulates?

Part D: Challenge Problem

Can you extend the construction from Proposition 2 to build something more complex? Sketch your result below and explain what you created.

Part E: Self-Assessment

Reflect honestly on your understanding. There are no wrong answers here.

1. Could you explain to someone else why this proof works, without looking at your notes?

- ☐ Yes, I could explain the whole proof
- ☐ I could explain most of it but might get stuck
- ☐ I'd need to look at the steps again

2. Which part of this lesson was hardest for you?

- ☐ Drawing the construction / diagram
- ☐ Understanding why the proof works (the logic)
- ☐ Matching proof steps to toolkit items
- ☐ The extension questions

3. What would you do differently next time?
