

Student Notes Sheet — Lesson 2.5 | Euclid's 10 Axioms

The axioms are written out for you. Use the space on the right to draw a diagram, write an example, or make a note that helps you remember each one.

Key Idea

An **axiom** (also called a postulate or common notion) is a statement accepted as true without proof. It is the starting point from which all other results are derived.

Euclid's geometry begins with exactly **10 axioms** — 5 postulates and 5 common notions. Everything else in the course is a logical consequence of these 10 statements.

The Five Postulates

#	Statement	Diagram / Notes
P1 <i>Postulate 1</i>	A straight line can be drawn connecting any two points.	
P2 <i>Postulate 2</i>	A finite line segment can be extended indefinitely in either direction.	
P3 <i>Postulate 3</i>	A circle can be drawn with any given center point and any given radius.	
P4 <i>Postulate 4</i>	All right angles are equal to one another.	
P5 <i>Postulate 5</i>	(Euclid's version) If a straight line crosses two other lines and makes the interior angles on one side sum to less than two right angles, those two lines will meet on that side if extended far enough. — or — (Playfair's version) Through any point not on a given line, there is exactly one line that can be drawn parallel to the given line. Our class also accepts: If a transversal crosses two lines and the co-interior angles sum to 180°, the lines are parallel. Our class will use Playfair's / Euclid's version:	

The Five Common Notions

#	Statement	Diagram / Notes
CN1 <i>Common Notion 1</i>	Things that are equal to the same thing are also equal to each other. ($a = c$ and $b = c \rightarrow a = b$)	
CN2 <i>Common Notion 2</i>	If equals are added to equals, the wholes are equal. ($a = b$ and $c = d \rightarrow a + c = b + d$)	
CN3 <i>Common Notion 3</i>	If equals are subtracted from equals, the remainders are equal. ($a = b$ and $c = d \rightarrow a - c = b - d$)	
CN4 <i>Common Notion 4</i>	Things that coincide with one another are equal to one another. Reflexive Property: Any figure is congruent (equal) to itself. $a = a$, $AB \cong AB$, $\angle ABC \cong \angle ABC$.	
CN5 <i>Common Notion 5</i>	The whole is greater than the part — and the whole equals the sum of its parts. Segment Addition: If B is between A and C , then $AB + BC = AC$. Angle Addition: If ray BD is in the interior of $\angle ABC$, then $m\angle ABD + m\angle DBC = m\angle ABC$.	

Memorization Note

You are responsible for knowing all 10 axioms by number. When you write a proof, you will cite them by name: "by Postulate 2" or "by Common Notion 1."

Study tip: don't re-read the list. Cover it, say the postulate aloud, check yourself. Mix them with other material. Space your practice out over several days.