

Your Personally Illustrated Examples of Definitions, Postulates, and Theorems of Quarter 1

This first quarter we have begun our journey of making mathematical proofs. This quarter's important Definitions, Postulates and Theorems often used in proofs are listed in the next few pages of this pdf document. For each:

1. Write out the definition, postulate, or theorem (try to make it a If-then statement).
2. Draw an example diagram to **illustrate the hypothesis** of the definition, postulate, or theorem.
3. **State your example's conclusion** based on the definition, postulate, or theorem you are illustrating.

Example:

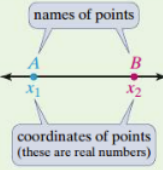
First we find the Ruler Postulate on page 19:

Postulate 1.4-1 Ruler Postulate

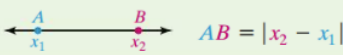
The points on a line can be paired, one-to-one, with a real number. The real number that corresponds to a point is called the **coordinate** of the point.

The above allows us to calculate distance. The **distance** between points A and B is the absolute value of the difference of their coordinates.

We use the notation AB for distance or the length of \overline{AB} .



The diagram shows a horizontal line with arrows at both ends. Two points are marked on the line: a blue point labeled A with coordinate x_1 below it, and a red point labeled B with coordinate x_2 below it. A bracket above the line connects the two points, with the text "names of points" above it. Another bracket below the line connects the two points, with the text "coordinates of points (these are real numbers)" below it.

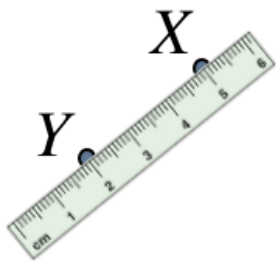


The diagram shows a horizontal line with arrows at both ends. Two points are marked on the line: a blue point labeled A with coordinate x_1 below it, and a red point labeled B with coordinate x_2 below it. To the right of the line, the equation $AB = |x_2 - x_1|$ is written.

1. Write it as a conditional (“if-then”) statement (when possible):

“If you place a number line between two points, the distance between the points is the (absolute value of the) difference between their coordinates”

2. Draw the hypothesis (feel free to draw your own here)



3. State the conclusion
 $XY = |5 - 2| = 3$.

Chapter 1

1. §1.2 Definitions, page 9

(a) Geometry:

(b) Logic:

(c) Definition:

(d) The difference of a Postulate and an Axiom:

(e) Theorem:

2. §1.3 Important Notation and Definitions for Points, Lines and Planes

(a) Point

(b) Line

(c) Segment (or Line Segment)

(d) Angle

(e) Ray

(f) Plane

(g) Space

(h) opposite rays

(i) intersection

(j) collinear

(k) coplanar

(l) congruent

3. §1.4: Measure of Segments and Angles

- (a) coordinate
- (b) distance
- (c) congruent
- (d) midpoint
- (e) bisect
- (f) the difference between \overleftrightarrow{AB} , \overrightarrow{AB} , \overline{AB} , and AB

4. Ruler Postulate (p. 19)

5. Segment Addition Postulate (p. 21)

6. Protractor Postulate (p. 26)

7. Angle Addition Postulate (p. 28)

8. §1.6 Angle Pairs and Their Relationships

(a) Adjacent Angles

(b) Vertical Angles (p. ____)

(c) Linear Pair (p. ____)

(d) Complement/Complementary Angles (p. ____)

(e) Supplement/Supplementary Angles (p. ____)

(f) Angle Bisector (p. 34)

Chapter 2 - Reasoning and Proofs

9. §2.1 Review: Perimeter, Circumference, and Area

- (a) Square
- (b) Rectangle
- (c) Triangle
- (d) Circle

10. §2.3 Conditional Statements

- (a) hypothesis
- (b) conclusion
- (c) negation

11. Truth Tables and Conditional Statements

- (a) Inverse
- (b) Converse
- (c) Contrapositive

12. §2.4

- (a) Biconditional Statement
- (b) Good Definition

13. §2.5 Deductive Reasoning

(a) Law of Detachment: If (_____ is true AND _____ is true),
then _____ is true. Example:

(b) Law of Syllogism: If (_____ is true AND _____ is true),
then _____ is true. Example:

§2.6 Two Column Proofs

14. Properties of Equality

- (a) Reflexive
- (b) Symmetric
- (c) Transitive

15. Algebra Properties of Equality

- (a) Addition Property
- (b) Subtraction Property
- (c) Multiplication Property
- (d) Division Property
- (e) Substitution Property
- (f) Distributive Property

§2.7 Proving Theorems About Angles

16. Equal Complements Theorem

17. Equal Supplements Theorem

18. Equal Supplementary Angles Theorem

19. Linear Pair Theorem

20. Vertical Angles Theorem*

21. Right Angles Theorem

Chapter 3 Parallel (\parallel) and Perpendicular (\perp) Lines

22. Angles Pairs formed by Transversals (p. ____)

- (a) Alt Int \angle 's
- (b) Same-side Int \angle 's
- (c) Corr \angle 's
- (d) Alt Ext \angle 's

§3.2-3.4 Proving Lines Are Parallel

23. Parallel Postulate (p. ____)

24. Perpendicular Postulate (p. ____)

25. Two Lines \perp to a Third Line (p. ____)

26. Iff Corresponding Angles \cong , then the lines are \parallel Postulate (p. ____)

27. Iff Alternate Interior Angles \cong , then the lines are \parallel Theorem (p. ____)

28. Iff Alternate Exterior Angles \cong , then the lines are \parallel Theorem (p. ____)

29. Iff Same-Side Interior Angles Are Supplementary, then the lines are \parallel Theorem (p. ____)

30. \perp Transversal Theorem (p. ____)

31. Two Lines Parallel Lines (p. ____)

32. Transitive Property of Parallel Lines (p. ____)

§3.5 Constructions

33. (a) Constructing a Parallel Line

(b) Constructing a \perp Through a Point on a Line

(c) Constructing a \perp Through a Point NOT on a Line

§3.6 - 3.7 Coordinate Geometry

34. (a) Find slope

(b) Slope-Intercept Form of a line

(c) Point-slope Form of a Line

(d) Standard Form of a Line

(e) Slope of a \perp Line

(f) Vertical Line Equation

(g) Horizontal Line Equation

Chapter 4

35. Types of Triangles

(a) Acute

(b) Obtuse

(c) Equalangular/Equalateral

(d) Right

(e) Scalene

(f) Isosceles

36. Triangle Sum Theorem (p. ____)

37. Corollary: Exterior Angle of a \triangle Theorem (p. ____)

38. Corollary: Acute Angles of a Rt- \triangle

§4.2 Congruent Figures:

39. Third Angles Theorem

40. Corresponding Parts of \cong Figures are \cong (CPCF or CP \cong \triangle are \cong , etc.) (p. ____)

§4.3 - §4.6: Congruent \triangle 's

41. SSS (Side-Side-Side) (p. ____)

42. SAS (Side-Angle-Side) (p. ____)

43. ASA (Angle-Side-Angle) (p. ____)

44. AAS (Angle-Angle-Side) (p. ____)

45. Isosceles Base Angles Theorem (p. ____)

46. \perp Bisector of the Base of an Isosceles \triangle Theorem (p. ____)

47. HL (Hypotenuse-Leg) (p. ____)