

CHAPTER 1 – POINTS, LINES, PLANES, AND ANGLES

Objectives/Goals

1-2 – Points, Lines, Planes

Use undefined terms point, line, and plane.

Draw representations of points, lines, and planes.

Use the terms collinear, coplanar, and intersection.

1-3 – Segments, Rays, and Distance

Use symbols for lines, segments, rays, and distances.

Find distances.

State and use the Ruler Postulate and the Segment Addition Postulate.

1-4 – Angles

Name angles and find their measures,

State and use the Angle Addition Postulate.

Recognize what can be concluded from a diagram.

1-5 – Postulates and theorems Relating Points, Lines, and Planes

Use postulates and theorems relating points, lines, and planes

Essential Questions

- 1.) What are the basic geometric building blocks and how are they characterized?
- 2.) What is the segment addition postulate?
- 3.) What are angles and how are they measured?
- 4.) What is the angle addition postulate?
- 5.) What is the key difference between a postulate and a theorem?
- 6.) What are the ways to classify angles according to their measures?

Chapter 1 terms to know

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|----------------------|---------------------|-----------------------|
| Point | Rays | Bisector of a segment |
| Line | Postulates | Angle |
| Plane | Endpoint | Sides of an angle |
| Space | Line segment | Vertex of an angle |
| Collinear points | Ray | Acute |
| Coplanar points | Opposite rays | Right |
| Non-collinear points | Coordinate | Obtuse |
| Non-coplanar points | Length | Straight angle |
| Intersection | Congruent | Adjacent |
| Segments | Midpoint of segment | Bisector of an angle |

Theorems
Existence
Uniqueness

CHAPTER 1

Postulate 1 – Ruler Postulate

1. The points on a line can be paired with the real numbers in such a way that
any two points can have coordinates 0 and 1.
2. Once a coordinate system has been chosen in this way, the distance between any two points equals the absolute value of the difference of their coordinates.

Postulate 2 – Segment Addition Postulate – If B is between A and C, then $AB + BC = AC$.

Postulate 3 – Protractor Postulate – On AB in a given plane, choose any point O between A

and B. Consider OA and OB and all the rays that can be drawn from O on one side of AB. These rays can be paired with the real numbers from 0 to 180 in such a way that:

- a) OA is paired with 0 and OB with 180.
- b) If OP is paired with x , and OQ with y , then $m\angle POQ = |x - y|$.

Postulate 4 – Angle Addition Postulate – If point B lies in the interior of $\angle AOC$, then $m\angle AOB + m\angle BOC = m\angle AOC$. If $\angle AOC$ is a straight angle and B is any point not on AC, then $m\angle AOB + m\angle BOC = 180$.

Postulate 5 A line contains at least two points; a plane contains at least three points not all in one line; space contains at least four points not all in one plane.

Postulate 6 Through any two points there is exactly one line.

Postulate 7 Through any three points there is at least one plane, and through any three noncollinear points there is exactly one plane.

Postulate 8 If two points are in a plane, then the line that contains the points is in that plane.

Postulate 9 If two planes intersect, then their intersection is a line

Theorem 1-1 If two lines intersect, then they intersect in exactly one point.

Theorem 1-2 Through a line and a point not in the line there is exactly one plane.

Theorem 1-3 If two lines intersect, then exactly one plane contains the lines.