LESSON 1-1

Understanding Points, Lines, and Planes

Lesson Objectives (p. 6):

identify, name, and draw points, lines, segments, rays, and planes; apply basic facts about points, lines, and planes.

Vocabulary

1. Undefined term (p. 6): a term that cannot be defined by using other figures, a building block of geometry
2. Point (p. 6): names a location and has no size
3. Line (p. 6): a straight path that has no thickness and extends forever.
4. Plane (p. 6): a flat surface that has no thickness and extends forever.
5. Collinear (p. 6): points that lie on the same line
6. Coplanar (p. 6): points that lie on the same plane
7. Segment (p. 7): the part of a line consisting of two points and all points between them.

8. Endpoint (p. 7): a point at the end of a segment or the starting point of a ray.

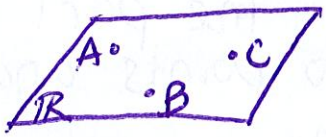
9. Ray (p. 7): a part of a line that starts an an endpoint and extends forever in one direction

10. Opposite rays (p. 7): two rays that have a common endpoint and form a line.

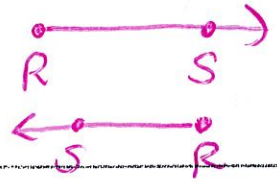
11. Postulate (p. 7): a statement that is accepted as true without proof

Key Concepts

12. Undefined Terms (p. 6):

Term	Name	Diagram
Point: names a location, has no size, and it's represented by a dot.	a capital letter point P	P
Line: a straight path that extends forever	• a lowercase letter • two points on the line • ℓ, $\overleftrightarrow{XY}$ or $\overleftrightarrow{AB}$	
Plane: a flat surface that extends forever	• script capital letter • 3 points not on a line • plane $\mathcal{R}$ or plane ABC	

13. Segments and Rays (p. 7):

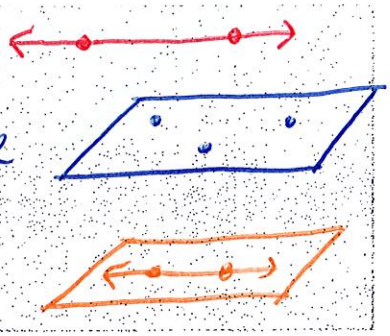
Definition	Name	Diagram
Segment: part of a line consisting of two points	• two endpoints • $\overline{AB}$ or $\overline{BA}$	
Endpoint: a point at the end of a segment or starting point of a ray	• capital letter • C and D	
Ray: part of a line that starts at an endpoint and extends forever in one direction	• its endpoint and any other point on the ray • $\overrightarrow{RS}$	
Opposite rays: two rays that have a common endpoint and form a line	• the common endpoint and any other point on each ray. • $\overrightarrow{EF}$ and $\overrightarrow{EG}$	

14. Postulates—Points, Lines and Planes (p. 7):

1-1-1 Through any two points there's exactly one line.

1-1-2 Through any 3 noncollinear points there is exactly one plane containing them.

1-1-3 If 2 points lie in a plane, then the line containg those points lie in the plane



15. Postulates—Intersection of Lines and Planes (p. 8):

1-1-4 If 2 lines intersect, then they intersect in exactly one point.

1-1-5 If 2 planes intersect, then they intersect in exactly one line.

LESSON 1-1

Reteach

Understanding Points, Lines, and Planes

Draw and label a diagram for each figure.

1. point *W*

W

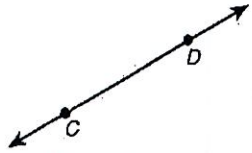
2. line *MN*

3. $\overline{JK}$

4. $\overline{EF}$

Name each figure using words and symbols.

5.

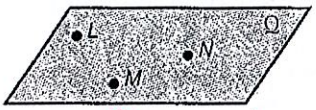


• line CD • $\overleftrightarrow{CD}$

6.

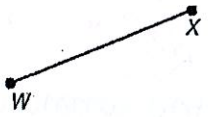
$\overrightarrow{ST}$

7. Name the plane in two different ways.



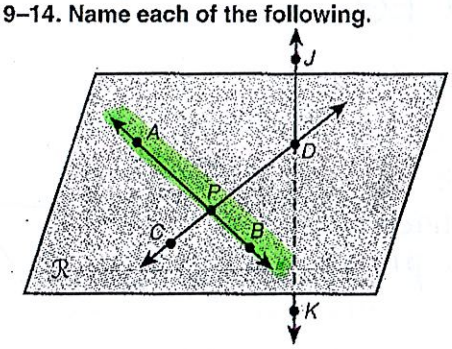
• plane Q • plane LMN

8.



$\overline{WX}$ or $\overline{XW}$

Use the figure for Exercises 9–14. Name each of the following.



9. three collinear points

A, P, B

10. three noncollinear points

A, D, K

11. four coplanar points

A, P, C, B

12. four noncoplanar points

J, K, A, C

13. two lines that intersect $\overline{CD}$

$\overleftrightarrow{AB}$

14. the intersection of $\overline{JK}$ and plane R

point D