Name _____ Date _____

1.1 Points, Lines, and Planes

For use with Exploration 1.1

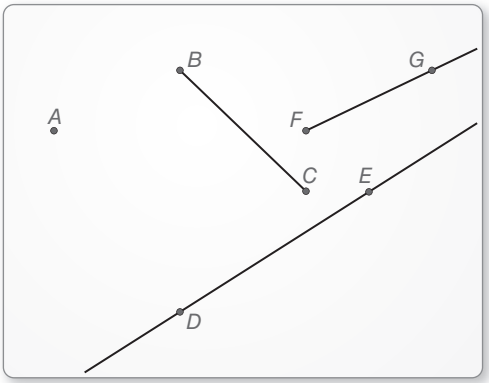
Essential Question How can you use dynamic geometry software to visualize geometric concepts?

1 EXPLORATION: Using Dynamic Geometry Software

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software to draw several points. Also, draw some lines, line segments, and rays. What is the difference between a line, a line segment, and a ray?

Sample

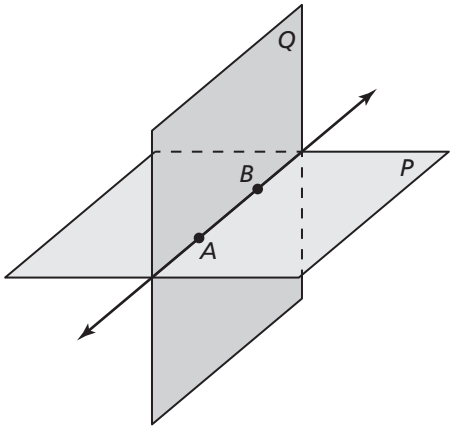


2 EXPLORATION: Intersections of Lines and Planes

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner.

a. Describe and sketch the ways in which two lines can intersect or not intersect. Give examples of each using the lines formed by the walls, floor, and ceiling in your classroom.



2 EXPLORATION: Intersections of Lines and Planes (continued)

b. Describe and sketch the ways in which a line and a plane can intersect or not intersect. Give examples of each using the walls, floor, and ceiling in your classroom.

c. Describe and sketch the ways in which two planes can intersect or not intersect. Give examples of each using the walls, floor, and ceiling in your classroom.

3 EXPLORATION: Exploring Dynamic Geometry Software

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software to explore geometry. Use the software to find a term or concept that is unfamiliar to you. Then use the capabilities of the software to determine the meaning of the term or concept.

Communicate Your Answer

4. How can you use dynamic geometry software to visualize geometric concepts?

Name_____ Date _____

1.1 Notetaking with Vocabulary (continued)

Core Concepts

Undefined Terms: Point, Line, and Plane

Point A **point** has no dimension. A dot represents a point.

point *A*

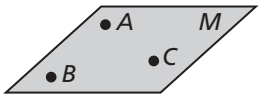
Line A **line** has one dimension. It is represented by a line with two arrowheads, but it extends without end.

Through any two points, there is exactly one line. You can use any two points on a line to name it.

line ℓ, line AB ($\overleftrightarrow{AB}$), or line BA ($\overleftrightarrow{BA}$)

Plane A **plane** has two dimensions. It is represented by a shape that looks like a floor or a wall, but it extends without end.

Through any three points not on the same line, there is exactly one plane. You can use three points that are not all on the same line to name a plane.



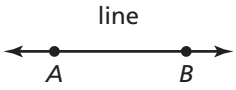
plane *M*, or plane *ABC*

Notes: **Colinear:**

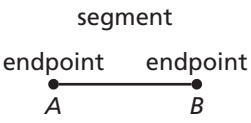
Coplanar:

Defined Terms: Segment and Ray

The definitions below use line AB (written as $\overleftrightarrow{AB}$) and points A and B.

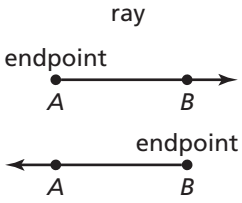


Segment The **line segment** AB, or **segment** AB (written as $\overline{AB}$) consists of the **endpoints** A and B and all points on $\overleftrightarrow{AB}$ that are between A and B. Note that $\overline{AB}$ can also be named $\overline{BA}$.

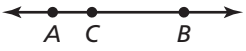


Ray The **ray** AB (written as $\overrightarrow{AB}$) consists of the endpoint A and all points on $\overrightarrow{AB}$ that lie on the same side of A as B.

Note that $\overrightarrow{AB}$ and $\overrightarrow{BA}$ are different rays.



Opposite Rays If point C lies on $\overleftrightarrow{AB}$ between A and B, then $\overrightarrow{CA}$ and $\overrightarrow{CB}$ are **opposite rays**.



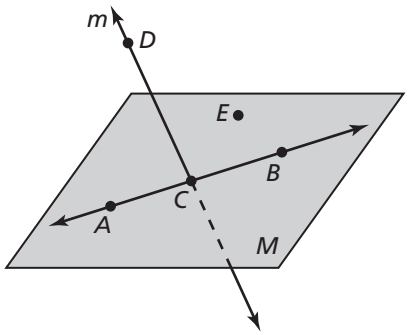
Notes:

Name _____ Date _____

1.1 Notetaking with Vocabulary (continued)

Extra Practice

In Exercises 1–4, use the diagram.



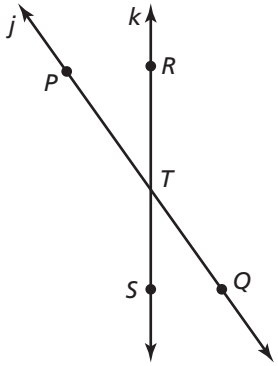
1. Give two other names for $\overleftrightarrow{CD}$.

2. Give another name for plane M.

3. Name three points that are collinear. Then name a fourth point that is not collinear with these three points.

4. Name a point that is not coplanar with points A, C, E.

In Exercises 5–8, use the diagram.



5. What is another name for $\overleftrightarrow{PQ}$?

6. What is another name for $\overleftrightarrow{RS}$?

7. Name all rays with endpoint T. Which of these rays are opposite rays?

8. On the diagram, draw planes M and N that intersect at line k.

In Exercises 9 and 10, sketch the figure described.

9. $\overline{AB}$ and $\overleftrightarrow{BC}$

10. line k in plane M