Geometry Notes 1.1

Undefined Terms

Point A **point** has no dimension. It is represented by a dot.

A
$\bullet$
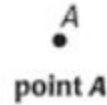
point *A*

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 ($\overleftrightarrow{BA}$)
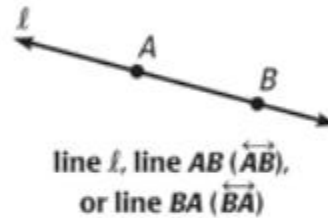
Plane A **plane** has two dimensions. It is represented by a shape that looks like a floor or a wall, but it extends without end.

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*
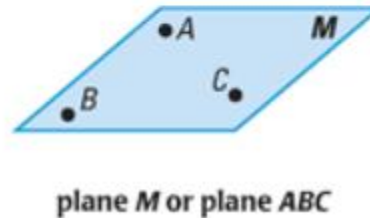
Collinear points are points that lie on the same line. **Coplanar points** are points that lie in the same plane.

EXAMPLE 1 Name points, lines, and planes

a. Give two other names for $\overleftrightarrow{PQ}$ and for plane *R*.

b. Name three points that are collinear. Name four points that are coplanar.

Solution

a. Other names for $\overleftrightarrow{PQ}$ are $\overleftrightarrow{QP}$ and line *n*. Other names for plane *R* are plane *SVT* and plane *PTV*.

b. Points *S*, *P*, and *T* lie on the same line, so they are collinear. Points *S*, *P*, *T*, and *V* lie in the same plane, so they are coplanar.
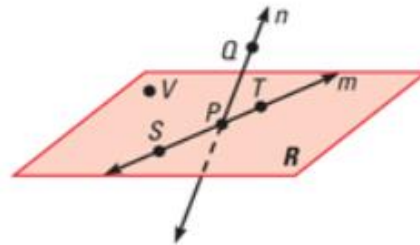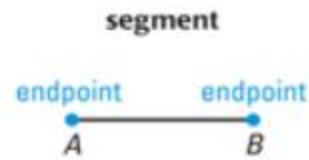
Defined Terms: Segments and Rays

Line AB (written as $\overleftrightarrow{AB}$) and points A and B are used here to define the terms below.

line

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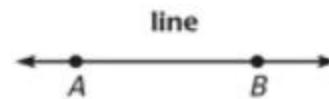
Segment The **line segment** AB, or **segment** AB, (written as $\overline{AB}$) consists of the **endpoints** A and B and all points on $\overleftrightarrow{AB}$ that are between A and B. Note that $\overline{AB}$ can also be named $\overline{BA}$.

segment

endpoint   endpoint

$\underset{A \qquad\qquad B}{\bullet\!\!-\!\!-\!\!-\!\!-\!\!-\!\!-\!\!\bullet}$

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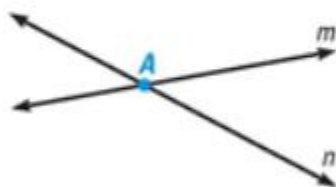
Note that $\overrightarrow{AB}$ and $\overrightarrow{BA}$ are different rays.

ray

endpoint

$\underset{A \qquad\quad B}{\bullet\qquad\quad\bullet\longrightarrow}$

endpoint

$\overset{\longleftarrow}{\underset{A \qquad\quad B}{\bullet\qquad\quad\bullet}}$

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

$\overset{\longleftrightarrow}{\underset{A\;\,C \qquad\quad B}{\bullet\,\bullet\qquad\quad\bullet}}$

INTERSECTIONS Two or more geometric figures *intersect* if they have one or more points in common. The **intersection** of the figures is the set of points the figures have in common. Some examples of intersections are shown below.

The intersection of two different lines is a point.
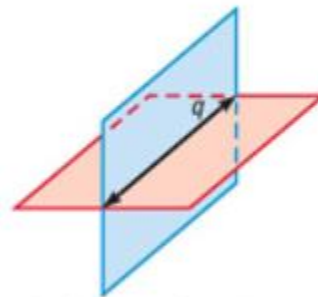
The intersection of two different planes is a line.