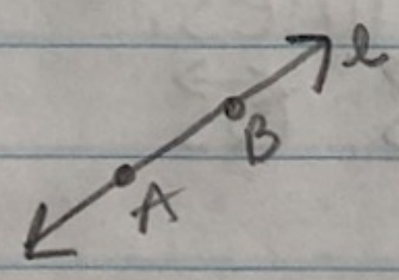
1.2 Points, Lines, and Planes

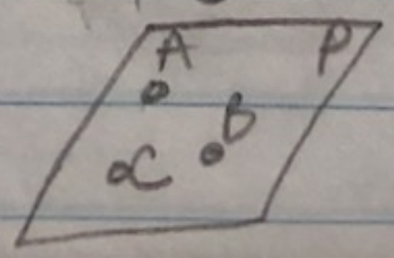
Goal: I can understand basic terms and postulates of geometry

Point - indicates a location and has no size
- Represented by a dot and named with a capital letter

Line - represented by a straight path that extends in two opposite directions without end and has no thickness. A line contains infinitely many points
- You can name a line by any two points on the line, such as $\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$, or by a single lower case letter, such a ℓ

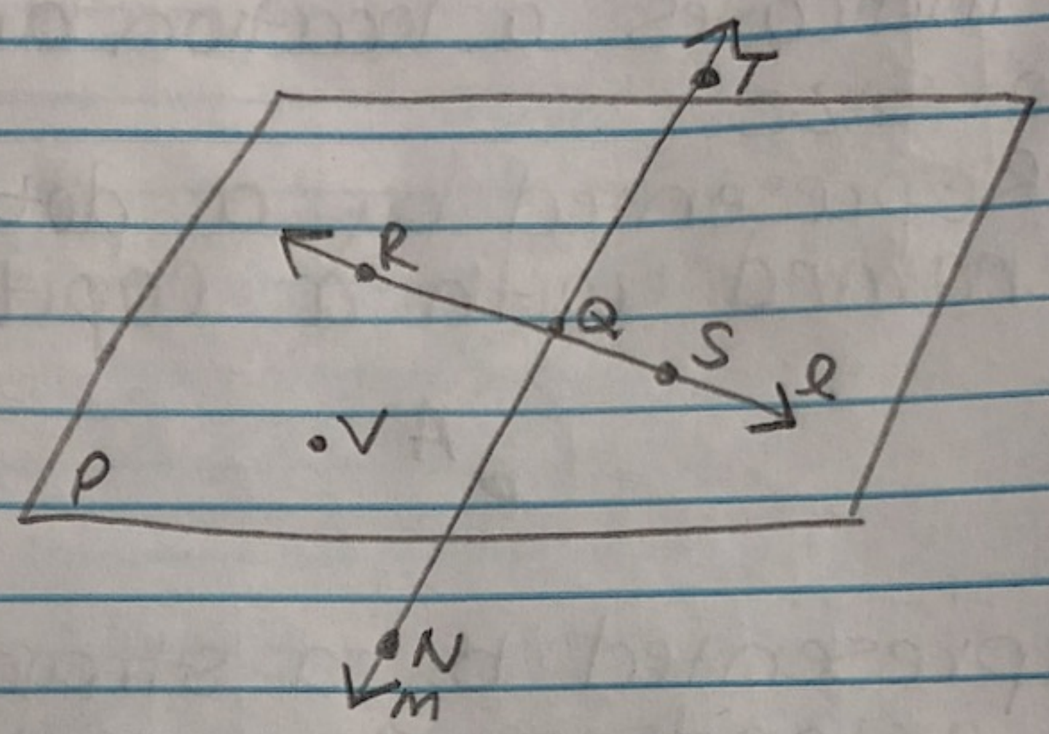


-Plane - represented by a flat surface that extends without end and has no thickness. A plane contains infinitely many lines.
- You can name a plane by a capital letter, such as P



-Collinear points- points that lie on the same line

-Coplanar- points and lines that lie in the same plane



Name the plane.

P

Name the points.

V

Name the lines.

$\overleftrightarrow{QT}$, $\overleftrightarrow{RS}$, $\overleftrightarrow{QS}$

Name three collinear points.

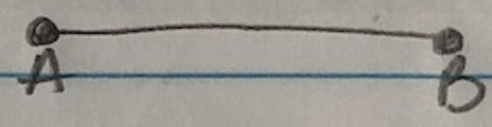
R, Q, S

Name three coplanar points

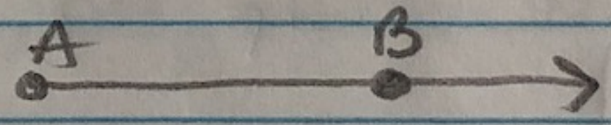
R, Q, V

- Space - the set of all points in three dimensions

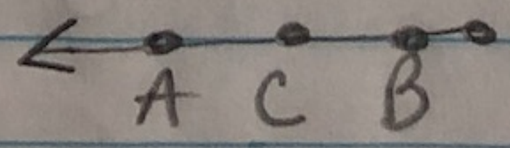
Segment - part of a line that consists of two endpoints and all points between them
- You can name a segment by its two endpoints, such as $\overline{AB}$ or $\overline{BA}$

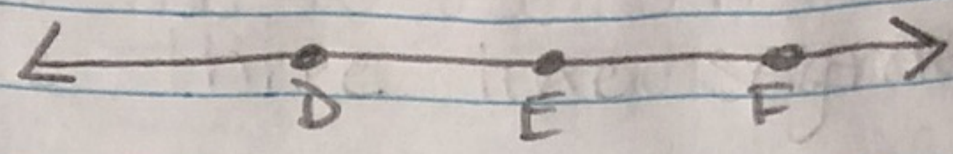


Ray - part of a line that consists of one endpoint and all the points of the line on one side of the endpoint
- You can name a ray by its endpoint and another point on the ray, $\overrightarrow{AB}$. The order of points indicates the rays direction



Opposite rays - two rays that share the same endpoint and form a line
- You can name opposite rays by their shared endpoint and any other point on each ray, $\overrightarrow{CA}$, $\overrightarrow{CB}$





Name three line segments.

$\overline{DE}$, $\overline{EF}$, $\overline{DF}$

Name four rays.

$\overrightarrow{DE}$, $\overrightarrow{DF}$, $\overrightarrow{EF}$ $\overrightarrow{FD}$

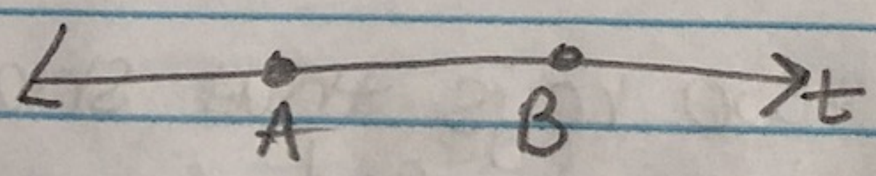
Name two opposite rays.

$\overrightarrow{ED}$ $\overrightarrow{EF}$

- Postulate / axiom - an accepted statement of fact

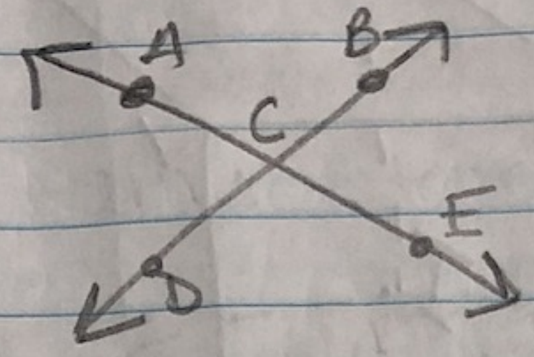
- Intersection - a set of points that figures have in common

Postulate 1-1



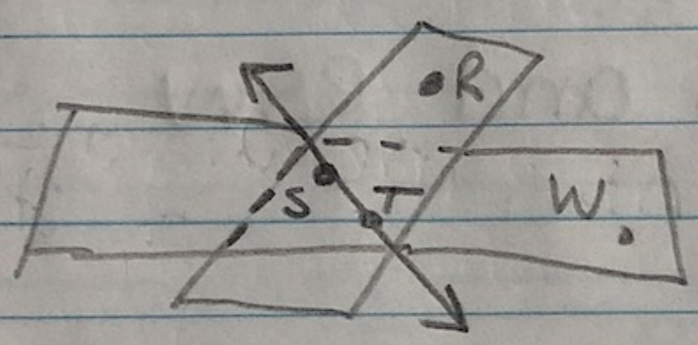
- Through any two points there is exactly one line.
- Line t passes through A and B. Line t is the only line that passes through both points.

Postulate 1-2



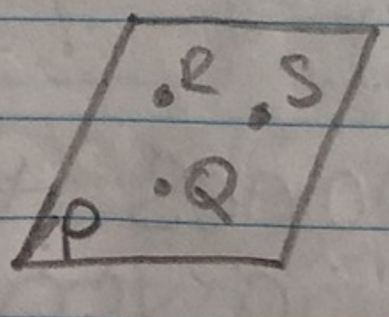
- If two distinct lines intersect, then they intersect in exactly one point.
- $\overleftrightarrow{AE}$ and $\overleftrightarrow{DB}$ intersect in point C

Postulate 1-3



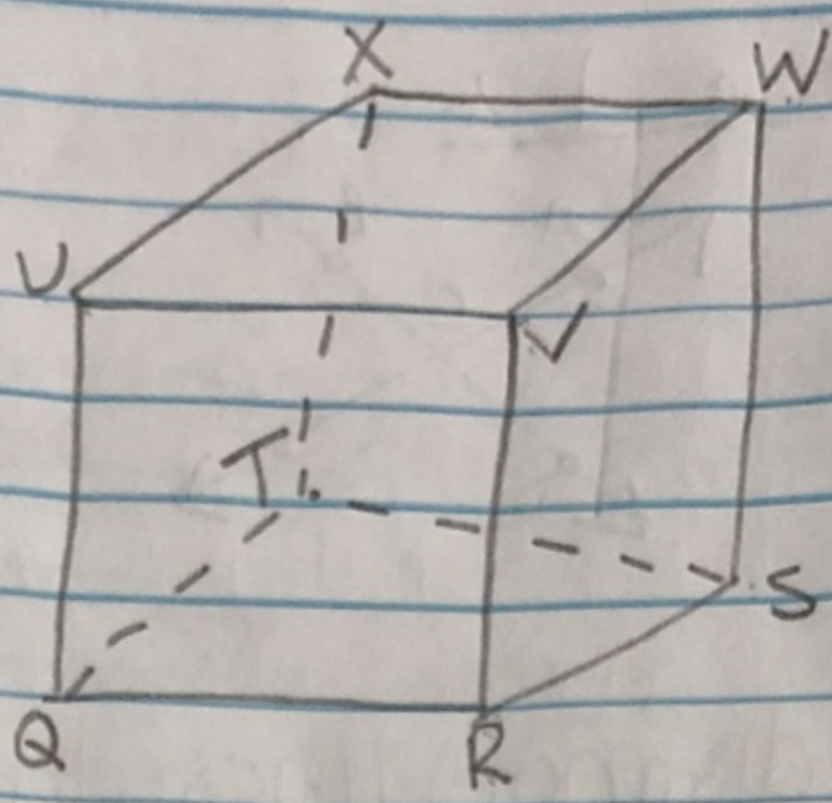
- If two distinct planes intersect, then they intersect in exactly one line
- Plane RST and plane WST intersects $\overleftrightarrow{ST}$

Postulate 1-4



- Through any three noncollinear points there is exactly one plane
- Points Q, R, S are noncollinear. Plane P is the only plane that contains them.

Practice



Name the intersection of each pair of planes

- Planes QRS and RSW

$\overleftrightarrow{RS}$

- Planes XWV and UVR

$\overleftrightarrow{UV}$

- Planes TXW and TQU

$\overleftrightarrow{VW}$

Name two planes that intersect the given line

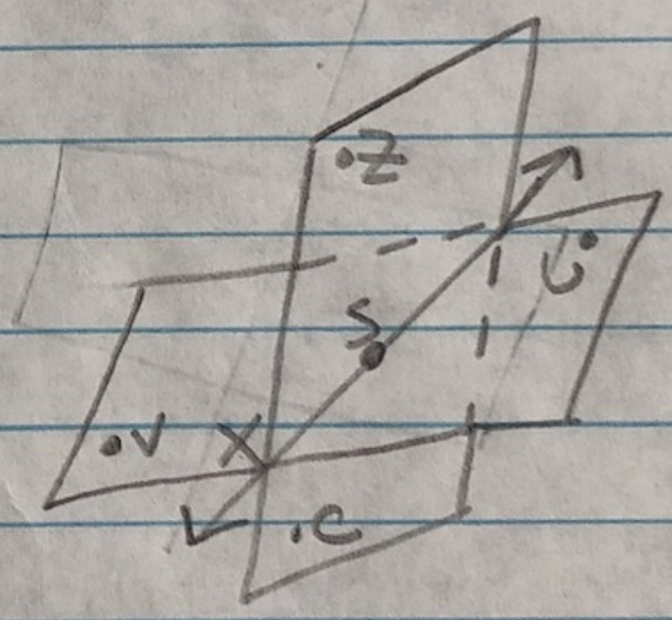
$\overleftrightarrow{QU}$

Plane QUX or QUV

$\overleftrightarrow{TS}$

Plane TSR or TSW

Find the plane that contains the first three points listed. Then determine whether the fourth point is in that plane. Write coplanar or noncoplanar to describe the points.



Z, S, Y, C

coplanar

X, Z, S, V

noncoplanar