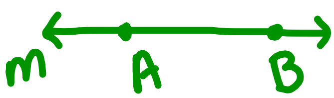
1.3 Points, Lines, and Planes

Objective: Use postulates and undefined terms.

A point has no dimension. It is represented by a small dot. It is named by a capital letter.

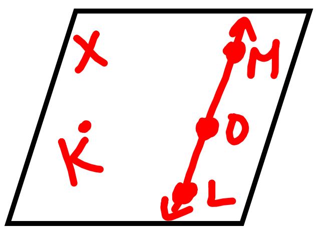
.P point P

A line has one dimension. It extends without end in two directions. It is represented by a line with with two arrowheads. It is named by to points (capital letters) on the line with the line symbol above or by a lower case letter.



$\overleftrightarrow{AB}$ $\overleftrightarrow{BA}$ m

A plane has two dimensions. It is represented by a shape that looks like a floor or wall. You have to imagine that it extends without end. It is named by a capital letter (not a point) or by three points (not on the same line) in the plane.



plane X

plane MOL wrong

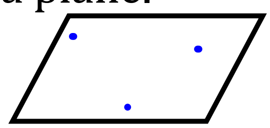
plane KLM

plane OLK

plane KXL wrong

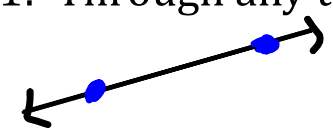
You need two points to describe a line.

You need three points to describe a plane.

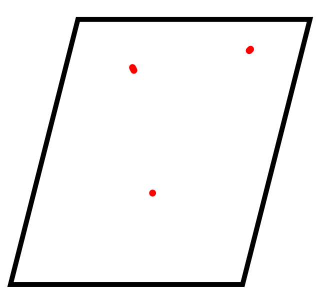


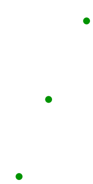
<u>Postulates</u> are statements that are accepted without further justification.

Postulate 1: Through any two points there is exactly one line



Postulate 2: Through any three points not on a line there is exactly one plane.





Example 1: Look at the figure on pg. 15

A. Name three points.

point A   point D

point B

not

n   T

P   S

m

B. Name two lines.

n   P

m

$\overleftrightarrow{CE}$ $\overleftrightarrow{DE}$

C. Name two planes.

plane T

plane S   plane BDE   ~~CDE~~

<u>Collinear points</u> are points that lie on the same line.

<u>Coplanar points</u> are points that lie on the same plane.

<u>Coplanar lines</u> are lines that lie on the same plane.

Example 2: Look at the figure on pg. 15.

A. Name three points that are collinear.

point C, point D, point E

B. Name four points that are coplanar.

point B and

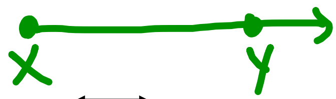
C. Name three points that are not collinear.

point A, point B, point C

A <u>segment</u> is a portion of a line. It has two endpoints (it does not extend without end). It is named by two points with the segment symbol above.

$\overline{AB}$ $\overline{BA}$

A <u>ray</u> is also a portion of a line. It has one endpoint and one side that extends without end. It is named using the endpoint and another point on the line with the ray symbol above.



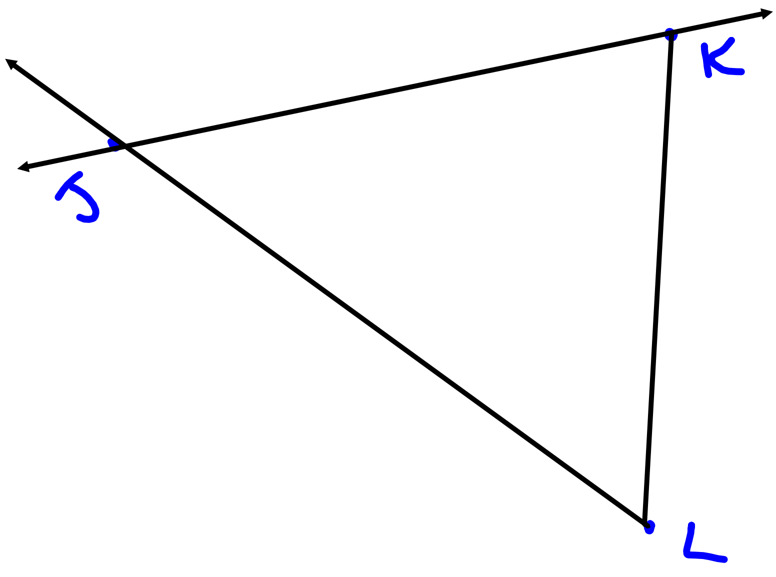
$\overrightarrow{XY}$ $\cancel{\overrightarrow{YX}}$ $\cancel{\overleftarrow{YX}}$

NOTE: $\overleftrightarrow{AB}$ is the same as $\overleftrightarrow{BA}$.

$\overline{AB}$ is the same as $\overline{BA}$.

$\overrightarrow{AB}$ is not the same as $\overrightarrow{BA}$. The rays have two different endpoints and extend in different directions.

Example 3: Draw three noncollinear points, J, K, and L. Then draw $\overleftrightarrow{JK}$, $\overline{KL}$, an $\overrightarrow{LJ}$.



Name
1.3
pg. 17-20 # 1-26
28-52 even
54-57
70