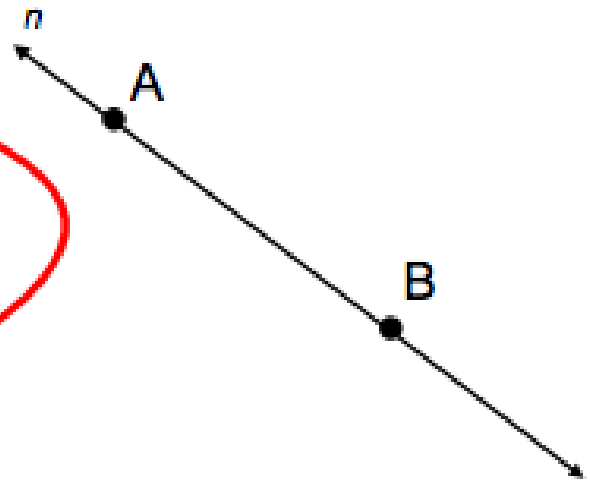
Lesson 1-2-"Points, Lines, and Planes"

Point: In geometry, points don't have an actual size. They can, however, represent objects that do have size. A point is usually named by a capital letter.

Line: A line has no thickness or width, although a picture of a line does. Arrows on each end of the line symbolize that the line extends indefinitely in both directions.

There are a number of ways we can name a line like the one below using words and symbols:

line n | Line AB ($\overleftrightarrow{AB}$) | Line BA ($\overleftrightarrow{BA}$)



Plane: In algebra, you used a coordinate plane. This plane contained points and lines. In geometry, a plane is a flat surface that extends indefinitely in all directions. We use four sided figures like the one below to model planes.

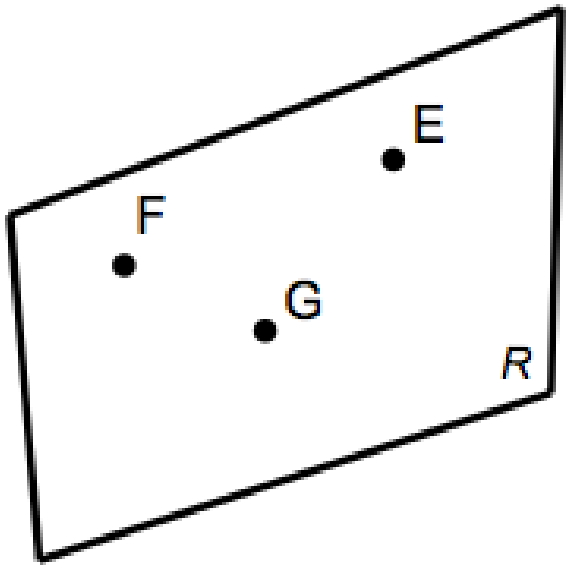
There are a number of ways to name a plane:

Plane R

Plane FEG

" GEF

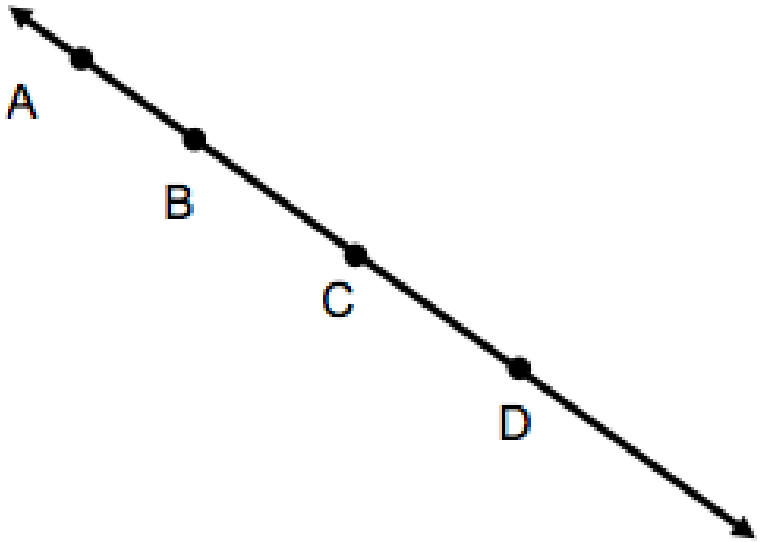
FGF



Example:

List all the possible names for each figure.

a. Line AB



Points C and D also lie on $\overleftrightarrow{AB}$. Choose two letters from the four named in the figure to name this line.

$\overleftrightarrow{BA}$

$\overleftrightarrow{CD}$

$\overleftrightarrow{DC}$

$\overleftrightarrow{BC}$

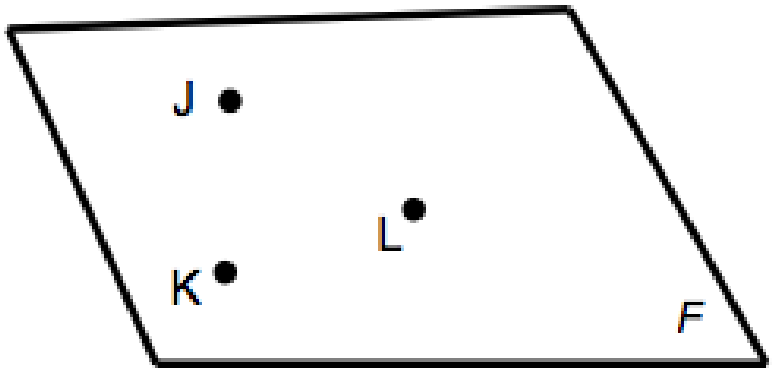
$\overleftrightarrow{AD}$

you get the idea.

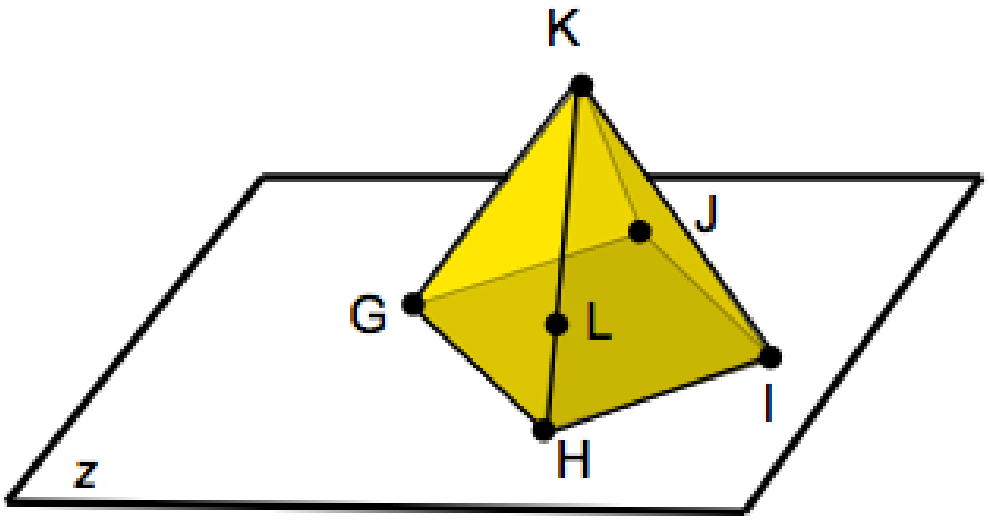
b. Plane *F*

Points J, K, and L lie on Plane *F*. Use different orders of these letters to name the plane.

Plane JLK
KLJ
JKL
LKJ



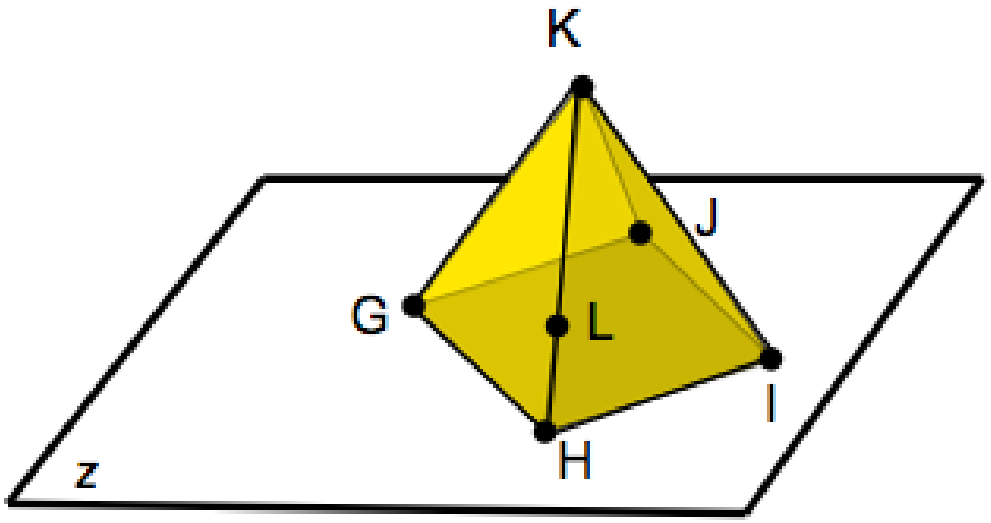
You should remember that collinear refers to points that lie on the same line. Points are **coplanar** if they lie on the same plane.



a. Are points K, L, and H collinear? Yes

b. Are points G, H, I, and K coplanar? No, K

c. How many planes appear in this figure? 5

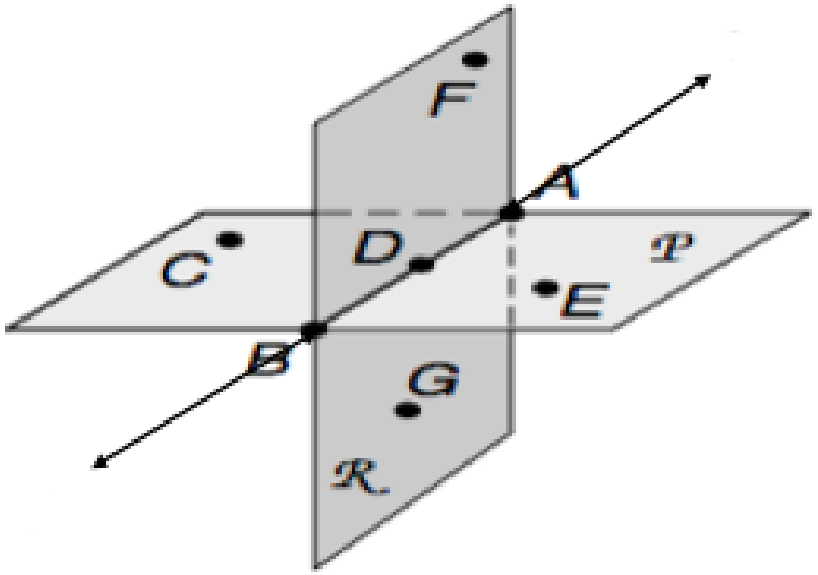


d. Name a point that is not collinear to L and H? G

e. Identify a point that is not in plane Z? K or L

f. What is the intersection of plane HGK and plane Z? $\overleftrightarrow{GH}$

Figures play an important role in understanding geometric concepts. Drawing and labeling figures can help you model and visualize various geometric relations.

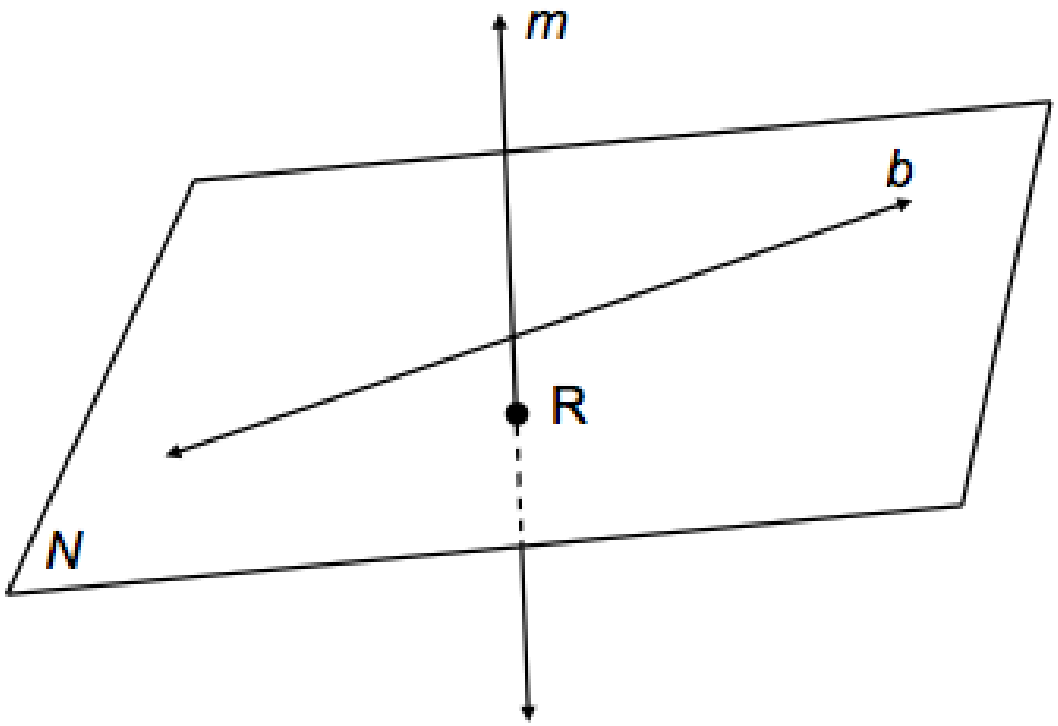


$\overleftrightarrow{BA}$ is in *P* and is in *R*

P and *R* both contain $\overleftrightarrow{BA}$

P and *R* intersect in $\overleftrightarrow{BA}$

$\overleftrightarrow{BA}$ is the intersection of *P* and *R*



- *b* and R are in *N*
- *N* contains R and *b*
- *m* intersects *N* at R
- R is the intersection of *m* with N

Draw and label a figure showing lines *NP* and *QR* intersecting at point S for the points N(3,-1), P(5,2), Q(-3,1), and R(0, -4).