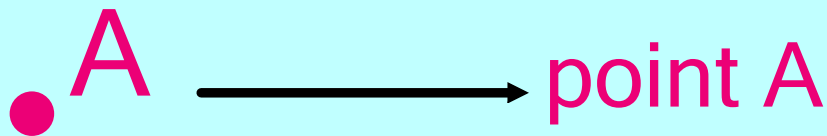
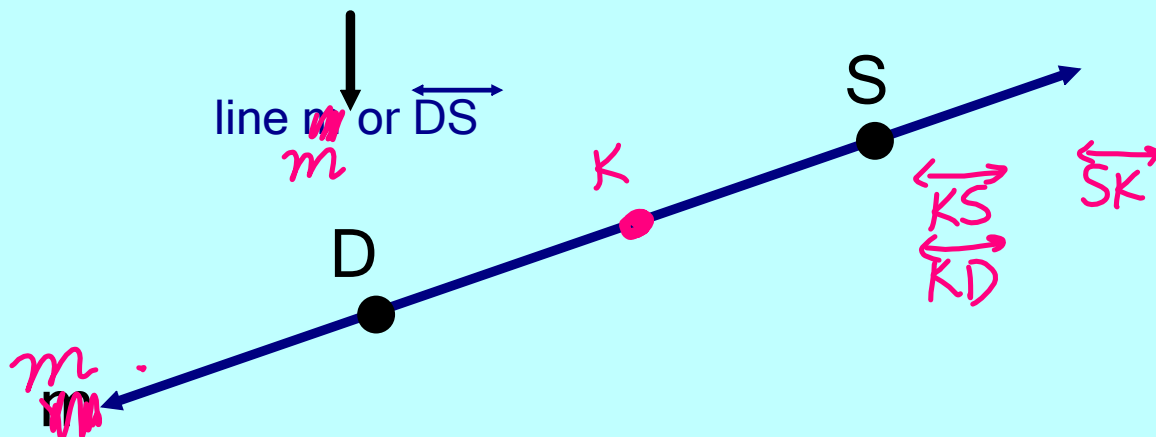


# 1.1 Points, Lines, and Planes

- point - has no size
- represented by a dot
  - named by capital letters



- line - extends without end in two directions
- shown with arrows at each end
  - two ways to name lines:
    1. by lower case script letters
    2. by writing capital letters for two points on the line

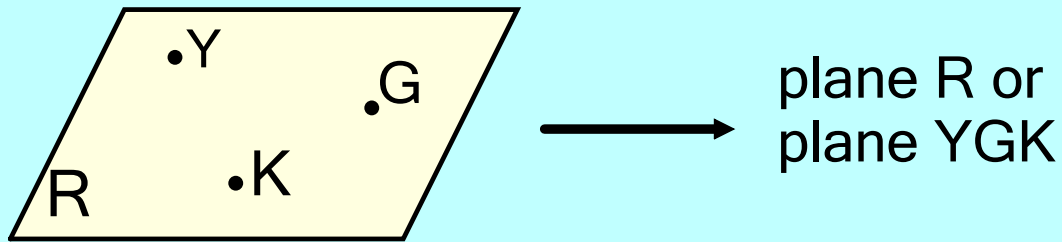


Collinear points - points that lie on the same line

plane - can be thought of as flat surfaces that extend indefinitely in all directions and have no thickness

(think of a floor or wall)

- named by a capital script letter or by three points not in a line on the plane



In geometry, the terms **point**, **line**, and **plane** are considered undefined terms because they cannot be defined using other words...only examples.

However, they are still used to define other geometric terms and properties.

such as...

coplanar points - points that lie on the same plane

Example 1

a) Name 4 points.

T, U, S, W

b) Name 2 lines.

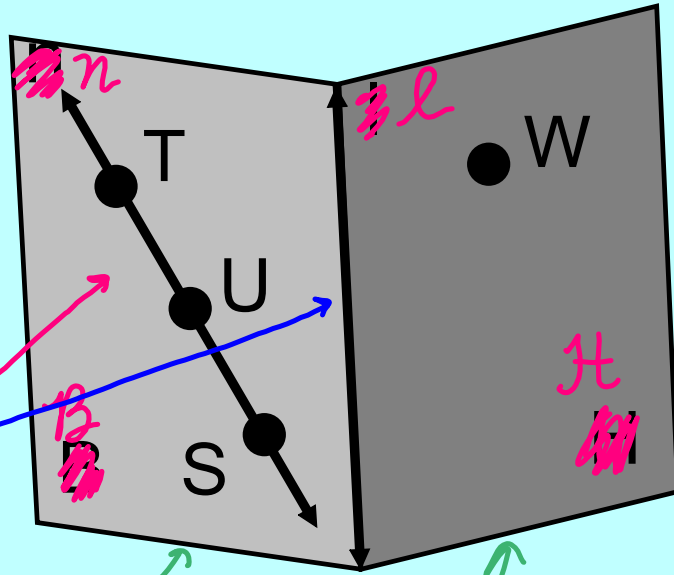
$\overleftrightarrow{TS} / \overleftrightarrow{SU} / \overleftrightarrow{ST} / \overleftrightarrow{UT}$   
line  $n$

line  $l$

c) Name 2 planes.

plane  $B$

plane  $H$



Example 2

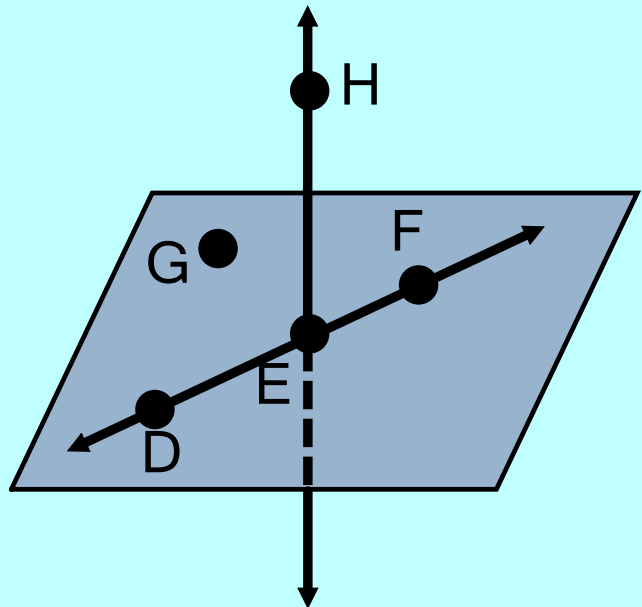
a) Name 3 points that are collinear.

F, D, E

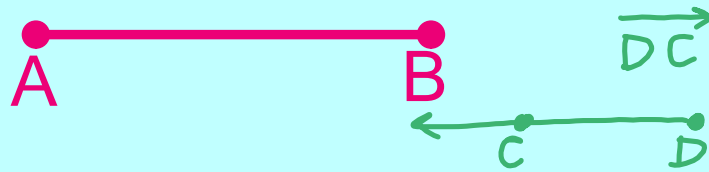
b) Name 4 points that are coplanar.

G, D, E, F

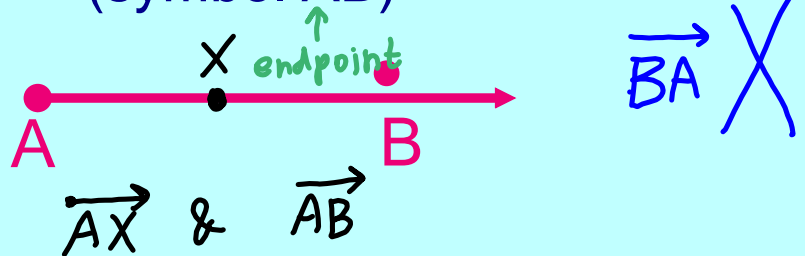
c) Name 3 points that are not collinear.  
H, G, D



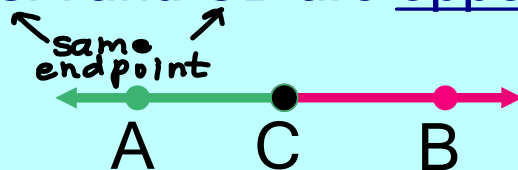
A line segment has endpoints.  
(symbol  $\overline{AB}$ )



A ray consists of an initial point A  
and all points on  $\overrightarrow{AB}$  that lie on  
the same side of A as point B.  
(symbol  $\overrightarrow{AB}$ )



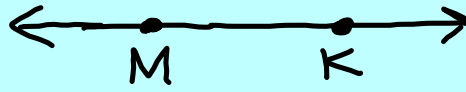
If C is between A and B  
(means A, B, & C are collinear),  
then  $\overrightarrow{CA}$  and  $\overrightarrow{CB}$  are opposite rays.



Any two opposite rays are collinear.

### Example 3

a) Draw  $\overleftrightarrow{MK}$



b) Draw  $\overline{MK}$

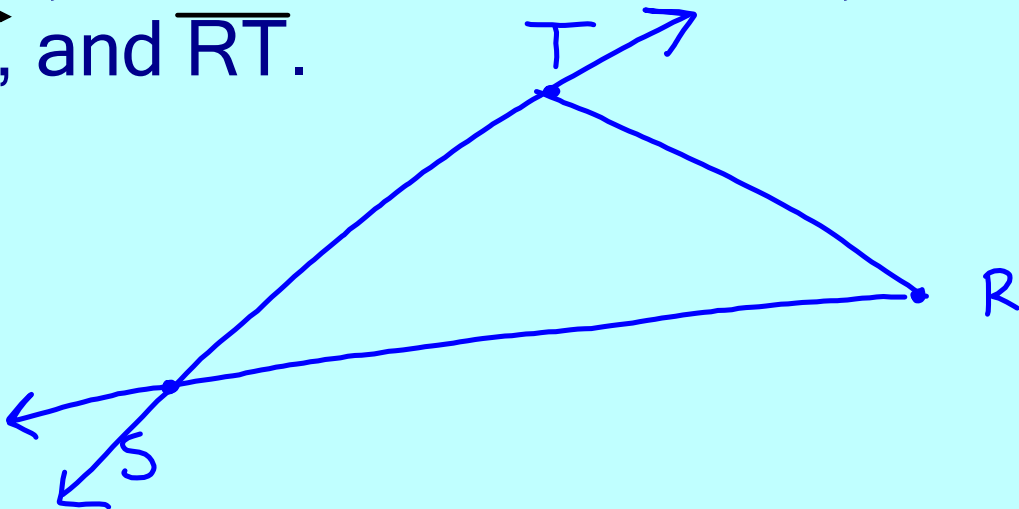


c) Draw  $\overrightarrow{MK}$



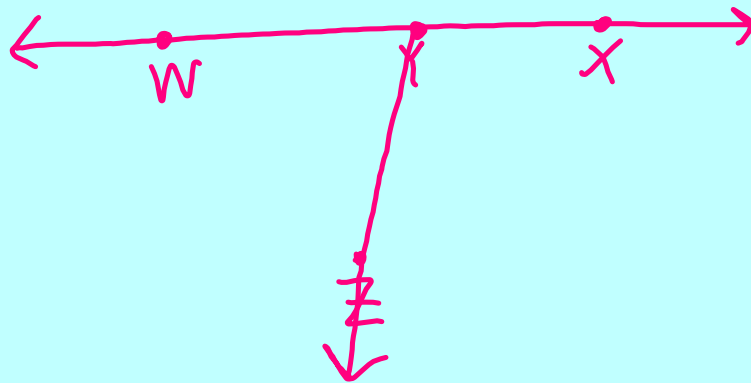
### Example 4

Draw 3 noncollinear points R, S, and T. Then draw  $\overline{RS}$ ,  $\overleftrightarrow{ST}$ , and  $\overrightarrow{RT}$ .

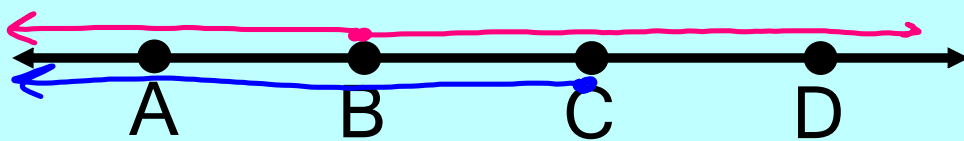


Example 5

Draw 3 collinear points W, Y, and X. Draw point Z which is not collinear with W, Y, and X. Draw  $\overrightarrow{YZ}$ .

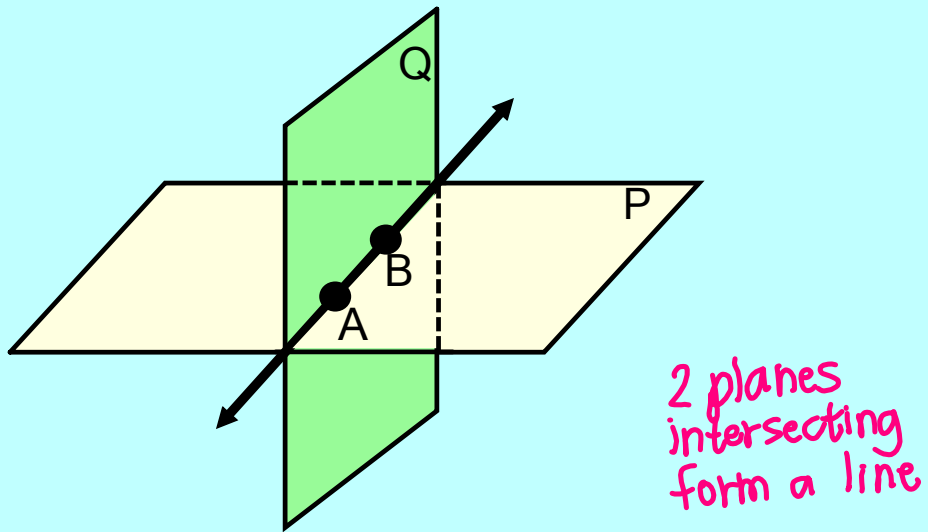
Example 6

Name two pair of opposite rays.



$\overrightarrow{BA}$  &  $\overrightarrow{BC}$  or  $\overrightarrow{BD}$   
 $\overrightarrow{CA}$  or  $\overrightarrow{CB}$  and  $\overrightarrow{CD}$

Two or more geometric figures **intersect** if they have one or more points in common.



### Example 7

Sketch a line that intersects a plane in one point.

