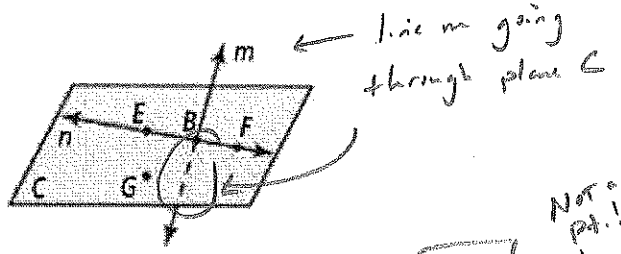**G.CO.1 – Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.**

(T) **Use the figure at the right for Exercises 8–11.**

    8. What are two other ways to name $\overleftrightarrow{EF}$? "line EF"

    9. What are two other ways to name plane *C*?

    10. Name three collinear points. in a line

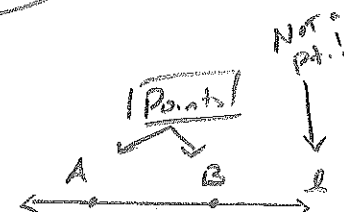   **11.** Name four coplanar points. on a plane

⑧ $\overleftrightarrow{EB}$, $\overleftrightarrow{BE}$, $\overleftrightarrow{FE}$, line n

⑨ plane EBG, BFG, EFG, ...
    (NOT plane EBF → collinear)

⑩ E, B, F

⑪ E, B, F, G

← line m going through plane C

|Points| NOT a pt.!

|Line|
$\overleftrightarrow{AB}$, $\overleftrightarrow{BA}$, or line ℓ (ℓ)
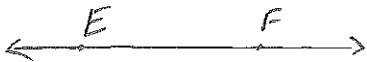2 pts ONLY!

|Plane| → Use a parallelogram

3 Pts ONLY! { plane ABC, plane BAC, ... plane Q

NOT a Pt!

(I) **6. Reasoning** Why do you use two arrowheads when drawing or naming a line such as $\overleftrightarrow{EF}$?

    ←— E   F —→

"goes on forever"

2 arrowheads are used b/c a line extends infinitely in 2 directions.

(T) **7. Compare and Contrast** How is naming a ray similar to naming a line? How is it different?

Similar — use 2 points to name

Different — Rays use one arrowhead whereas lines use 2 arrowheads.
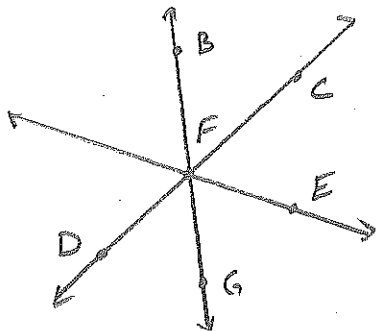
|Ray|
A   B $\overrightarrow{AB}$

A   B

6 pts   3 lines

(P)

37. Open-Ended Draw a figure with points *B, C, D, E, F,* and *G* that shows $\overleftrightarrow{CD}$, $\overleftrightarrow{BG}$, and $\overleftrightarrow{EF}$, with one of the points on all three lines.
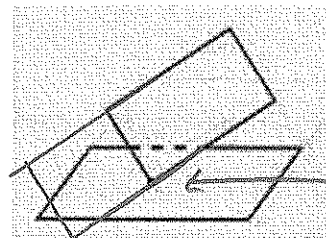
→ The 3 lines intersect at this point

[postulate]: accepted statement of fact "B/c Geometry says so!"

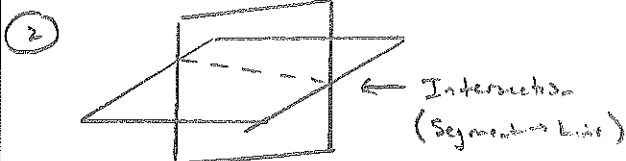[Post 2] The intersection of 2 lines is exactly one point

(T)

38. Think About a Plan Your friend drew the diagram at the right to prove to you that two planes can intersect in exactly one point. Describe your friend's error.
① • How do you describe a plane?
② • What does it mean for two planes to intersect each other?
③ • Can you define an endpoint of a plane?

← Intersection

① 2D surface that extends infinitely

② ← Intersection (Segment - Line)

③ No b/c it extends infinitely.

Planes intersect in a line, not a point.

[Post 4] The intersection of 2 planes is exactly one line.

(P)

39. Reasoning If one ray contains another ray, are they the same (ray?) Explain.

→ One Endpt / One Arrowhead

$\overrightarrow{AB}$ contains $\overrightarrow{BC}$ but they are different b/c they have different endpoints.
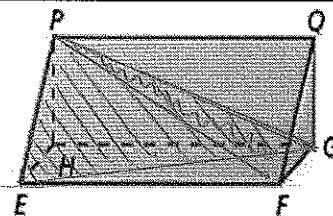
A   B   C

(T)

46. Use the diagram at the right. How many planes contain each line and point?
a. $\overleftrightarrow{EF}$ and point *G*   b. $\overleftrightarrow{PH}$ and point *E*
c. $\overleftrightarrow{FG}$ and point *P*   d. $\overleftrightarrow{EP}$ and point *G*
e. **Reasoning** What do you think is true of a line and a point not on the line? Explain. (*Hint:* Use two of the postulates you learned in this lesson.)

Statements of fact

ⓐ One - plane EFG
ⓑ One - plane EHP
ⓒ One - plane FGP } Draw
ⓓ One - plane EGP

ⓔ Exactly one plane contains the line and point.

[Post 1] Through any 2 points there is exactly one line.

[Post 3] Through any 3 non-collinear points there is exactly one plane.

50. Telecommunications A cell phone tower at point *A* receives a cell phone signal from the southeast. A cell phone tower at point *B* receives a signal from the same cell phone from due west. Trace the diagram at the right and find the location of the cell phone. Describe how Postulates 1-1 and 1-2 help you locate the phone.
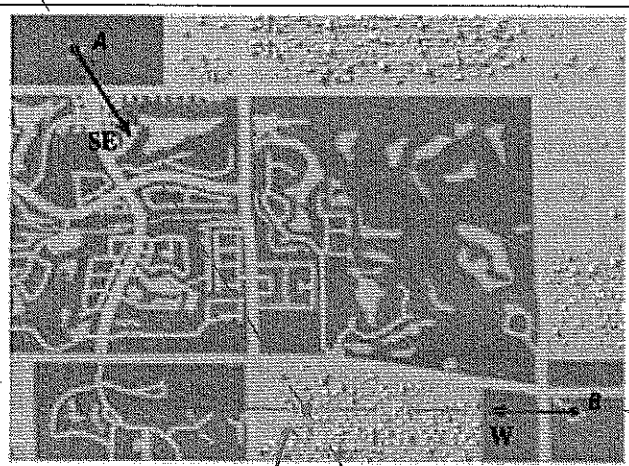
Post 1 | Through any 2 points there is exactly one line.

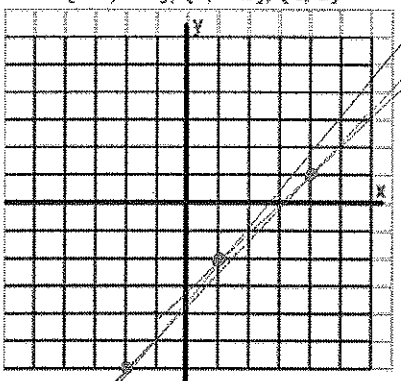Post 2 | The intersection of 2 lines is exactly one point.

Using Post 1 allows us to extend the directional rays, and Post 2 explains that the two lines will intersect at only one point - the location of the cell phone.

Coordinate Geometry Graph the points and state whether they are collinear.
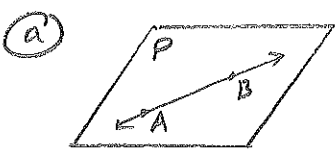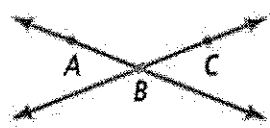
"in a line"

58. $(-2, -6), (1, -2), (4, 1)$

Noncollinear b/c there is not one line that contains all 3 points.

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61. a. Writing Suppose two points are in plane *P*. Explain why the line containing the points is also in plane *P*.

b. Reasoning Suppose two lines intersect. How many planes do you think contain both lines? Use the diagram at the right and your answer to part (a) to explain your answer.

(a) The line lies flat on the plane, and since a plane and line extend infinitely, the entire line will be contained in the plane.

(b) Only 1 plane. Since A, B and C are noncollinear, there is exactly one plane that contains them. | Post 3 |