Level 1 Geometry Received:

Name:_____ Block:

Co-existence

Definitions:

Co-linear: Three or more points are **co-linear** if you can draw a line through all of the three or more points.

Co-planar: Four or more points are **co-planar** if there is a plane containing all of the four or more points.

Questions:

1. Why do we talk about co-linear as 3 points or more?

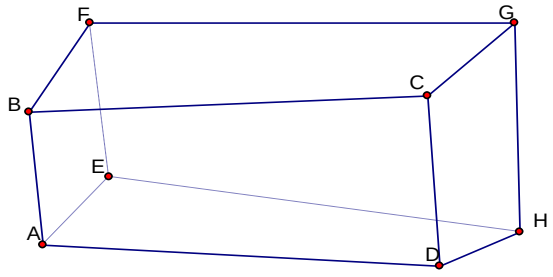
2. Why do we talk about co-planar as 4 points or more?

3. Are all the points that make up a line co-planar? Why or why not?

4. Why are 2 intersecting lines co-planar?

Problems : Refer to the figure which is a sort of three dimensional box.

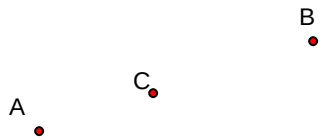
True (no way it could be false based on the diagram)
or False (it is possible to have a diagram like this without this being true) ?



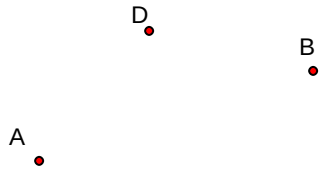
1. Points B and E are co-linear. _____
2. Points D,E and F are co-planar. _____
3. Lines $\overline{DC}$ and $\overline{AB}$ are co-planar. _____
4. Lines $\overline{CH}$ and $\overline{BF}$ are co-planar. _____
5. Lines $\overline{AE}$ and $\overline{EH}$ are co-planar. _____
6. Point A,B,E and F are co-planar. _____
7. Lines $\overline{DC}$, $\overline{DG}$ and $\overline{DB}$ are co-planar. _____
8. If you draw lines $\overline{FD}$ and $\overline{BG}$ they will intersect. _____

Two ways to determine "betweenness"

A point is "between" two others if you can draw a line segment from one point to the other that passes through the point.



C is between A and B because you can draw a line from A to B that passes through C.



D is not between A and B because the line segment from A to B does not pass through D.

Information from diagrams and Location of points

One of the more difficult early concepts in geometry is determining what information you can assume from a diagram. For example, on the last page, you might have been tempted to think that $\angle BAC$ was a right angle, but this is an example of an assumption you cannot made from a diagram.

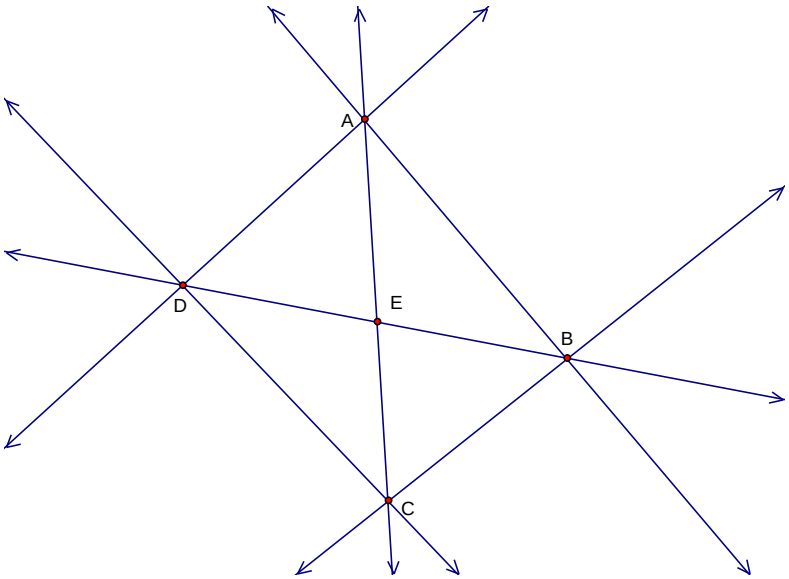
You May Assume:

- ✓ All lines are straight.
- ✓ If an angle looks straight, it is. (unless clearly stated otherwise)
- ✓ If a point looks like it is on a drawn line, it is.
- ✓ If a point looks like between two others, by the above definition, it is.
- ✓ If a point appears to be the intersection of two straight objects, it is.
  (However if you are told the figure is 3 dimensional, as on the previous page, you cannot assume there is an intersection. For example $\overline{BC}$ has no points in common [no intersection] with $\overline{EF}$.

You may not assume:

- ✖ that an angle is a right angle.
- ✖ that segments are congruent.
- ✖ that angles are congruent.
- ✖ that one angle or segment is smaller or larger than another (even if you measure!)
- ✖ that an angle is obtuse or acute.

Take a look at this figure.



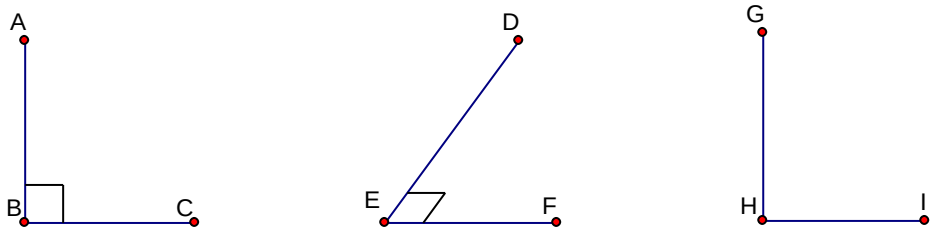
Using proper notation* make a list of thing you may assume and a list of things you may not assume. (this is a 2 dimensional figure) Work with you neighbors to be sure you get them all.

*the symbol for congruent is an equal sign with a tilda above it like this $\cong$. For example $\angle ABC \cong \angle XYZ$ (we say "angle ABC is congruent to angle XYZ")

Additional information on diagrams

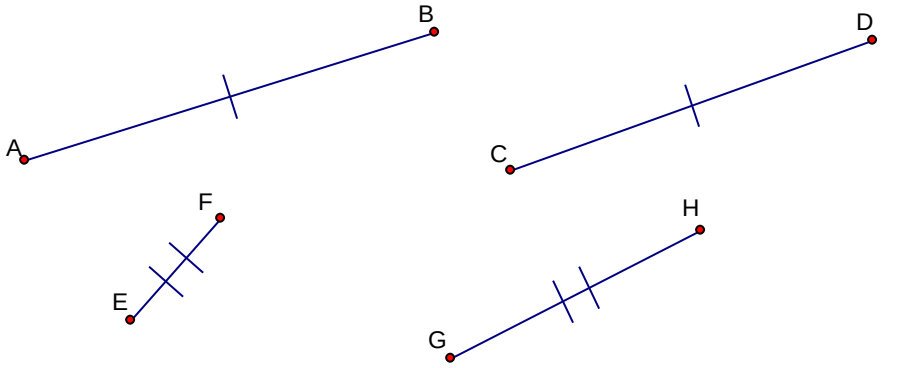
Often the diagram gives you some more information to help you solve a problem. Usually it is something you could not assume otherwise.

Right angles: diagrams in geometry have a special mark indicating an angle is right.



In this example $\angle ABC$ and $\angle DEF$ are right angles and $\angle GHI$ is not **regardless of how they appear!**

Congruent segments: a tick mark will appear on each of two congruent segments. Tick marks come in all shapes and sizes. Match up the tick marks to determine which segment is congruent to which.



So, in this example $\overline{AB} \cong \overline{CD}$ and, in spite of its appearance, $\overline{EF} \cong \overline{GH}$.

The following pages contain Homework exercises, If you complete the rest of this packet you begin the homework in class. I'd like these turned in by Friday but we will have an opportunity to discuss them before then.