

2.4 Use Postulates and Diagrams

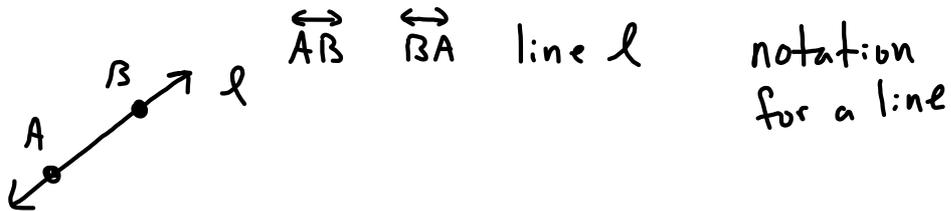
Goal: Use postulates involving points, lines, and planes.

Postulates or Axioms - rules that are accepted without proof
or a statement assumed to be true

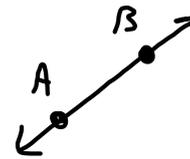
Theorems - rules that are proved

Point- Line- Plane- Postulates

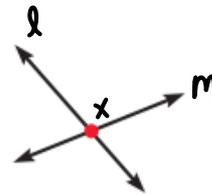
⑤ - Through any two points, there is exactly one line.



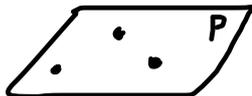
⑥ - A line contains at least two points.



⑦ - If two lines intersect, then their intersection is exactly one point.



⑧ - Through any three noncollinear points there exists exactly one plane.



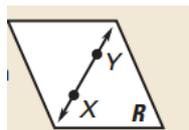
- A plane contains at least three noncollinear points.

⑨



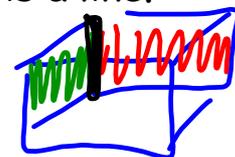
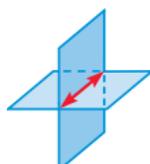
- If two points lie in a plane, then the line containing them lies in the plane.

⑩



- If two planes intersect, then their intersection is a line.

⑪



Interpreting a Diagram

When you interpret a diagram, you can assume information about size or measure only if it is marked.

YOU CAN ASSUME

All points shown are coplanar.

$\angle AHB$ and $\angle BHD$ are a linear pair.

$\angle AHF$ and $\angle BHD$ are vertical angles.

$A, H, J,$ and D are collinear.

\vec{AD} and \vec{BF} intersect at H .

YOU CANNOT ASSUME

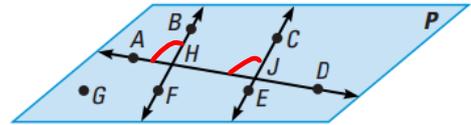
$G, F,$ and E are collinear.

\vec{BF} and \vec{CE} intersect.

\vec{BF} and \vec{CE} do not intersect.

$\angle BHA \cong \angle CJA$

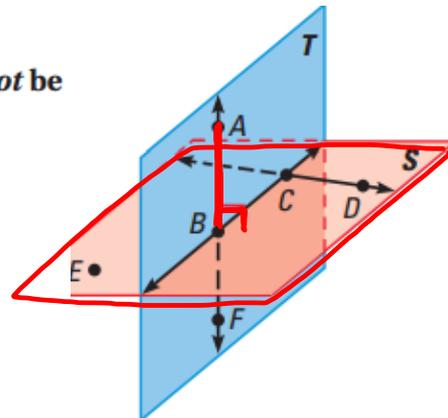
$\vec{AD} \perp \vec{BF}$ or $m\angle AHB = 90^\circ$



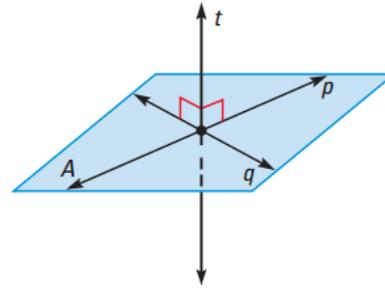
Interpret a diagram in three dimensions

Which of the following statements *cannot* be assumed from the diagram?

- CAN $A, B,$ and F are collinear.
- NOT $E, B,$ and D are collinear.
- CAN $\overline{AB} \perp$ plane S
- NOT $\overline{CD} \perp$ plane T
- CAN \vec{AF} intersects \vec{BC} at point B .



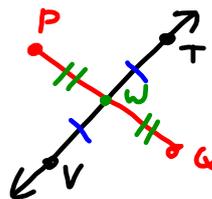
PERPENDICULAR FIGURES A line is a **line perpendicular to a plane** if and only if the line intersects the plane in a point and is perpendicular to every line in the plane that intersects it at that point.



In a diagram, a line perpendicular to a plane must be marked with a right angle symbol.

Use given information to sketch a diagram

Sketch a diagram showing \overleftrightarrow{TV} intersecting \overline{PQ} at point W , so that $\overline{TW} \cong \overline{VW}$.



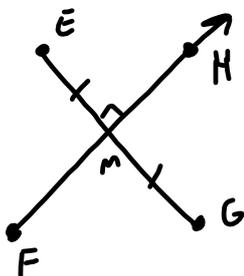
✓ If the given information stated \overline{PW} and \overline{QW} are congruent, how would you indicate that in the diagram?

✓ Name a pair of supplementary angles in the diagram. Explain. $\angle PWT$ $\angle TWQ$

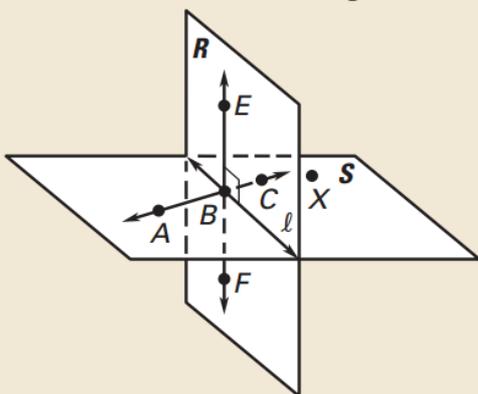
~~In the diagram for Example 4, can you assume plane S intersects plane T at \overleftrightarrow{BC} ?~~

~~Explain how you know that $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$ in Example 4.~~

Sketch a diagram showing $\overrightarrow{FH} \perp \overline{EG}$ at its midpoint M .



Which of the following cannot be assumed from the diagram?



A , B , and C are collinear.

$\overrightarrow{EF} \perp$ line l

$\overrightarrow{BC} \perp$ plane R **NOT**

\overrightarrow{EF} intersects \overleftrightarrow{AC} at B .

line $l \perp \overleftrightarrow{AB}$ **NOT**

Points B , C , and X are collinear. **NOT**

HW: PG 91 #'s 3, 4, 6-8, 10-24