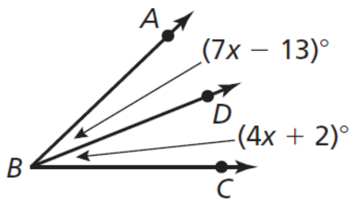
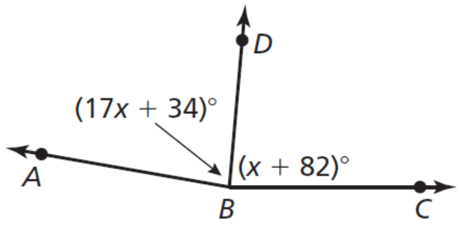
$\overrightarrow{BD}$ **bisects** $\angle ABC$**. Find** $m\angle ABD$ **and** $m\angle CBD$**.**

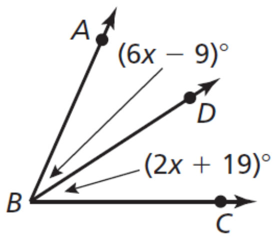
1.



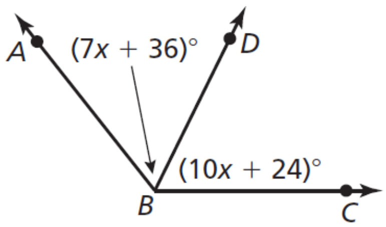
2.



3.



4.



Essential Question

In a diagram, what can be assumed and what needs to be labeled?

$\overleftrightarrow{AF}$ and $\overleftrightarrow{BD}$ are perpendicular.

$\overleftrightarrow{EG}$ and $\overleftrightarrow{BD}$ are parallel.

$\overleftrightarrow{AF}$ and $\overleftrightarrow{BD}$ are coplanar.

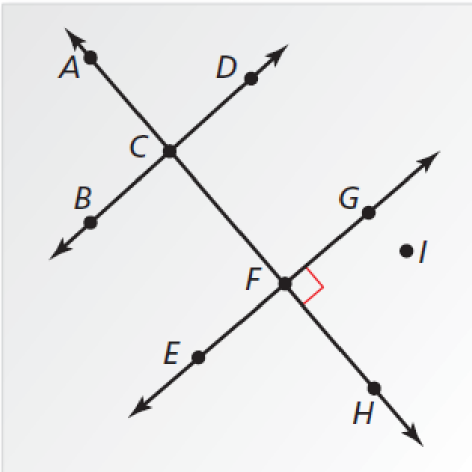
$\overleftrightarrow{EG}$ and $\overleftrightarrow{BD}$ do not intersect.

$\overleftrightarrow{AF}$ and $\overleftrightarrow{BD}$ intersect.

$\overleftrightarrow{EG}$ and $\overleftrightarrow{BD}$ are perpendicular.

$\angle ACD$ and $\angle BCF$ are vertical angles.

$\overleftrightarrow{AC}$ and $\overleftrightarrow{FH}$ are the same line.



Postulates

Point, Line, and Plane Postulates

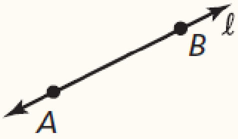
Postulate | **Example**

2.1 Two Point Postulate

Through any two points, there exists exactly one line.

2.2 Line-Point Postulate

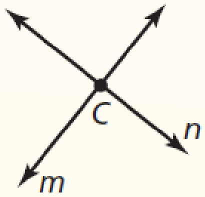
A line contains at least two points.



Through points *A* and *B*, there is exactly one line *ℓ*. Line *ℓ* contains at least two points.

2.3 Line Intersection Postulate

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



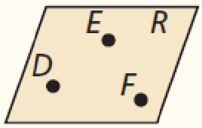
The intersection of line *m* and line *n* is point *C*.

2.4 Three Point Postulate

Through any three noncollinear points, there exists exactly one plane.

2.5 Plane-Point Postulate

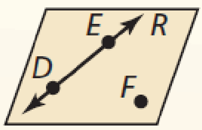
A plane contains at least three noncollinear points.



Through points *D*, *E*, and *F*, there is exactly one plane, plane *R*. Plane *R* contains at least three noncollinear points.

2.6 Plane-Line Postulate

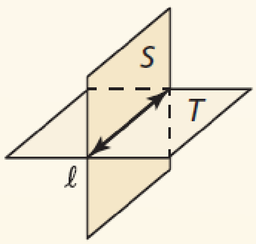
If two points lie in a plane, then the line containing them lies in the plane.



Points *D* and *E* lie in plane *R*, so $\overleftrightarrow{DE}$ lies in plane *R*.

2.7 Plane Intersection Postulate

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



The intersection of plane *S* and plane *T* is line *ℓ*.

Point, Line, and Plane Postulates

Postulate | **Example**

2.1 Two Point Postulate

Through any two points, there exists exactly one line.

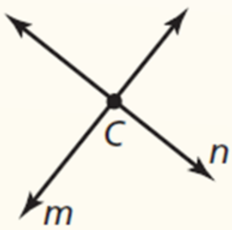
2.2 Line-Point Postulate

A line contains at least two points.

Through points *A* and *B*, there is exactly one line ℓ. Line ℓ contains at least two points.

2.3 Line Intersection Postulate

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



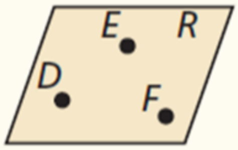
The intersection of line *m* and line *n* is point *C*.

2.4 Three Point Postulate

Through any three noncollinear points, there exists exactly one plane.

2.5 Plane-Point Postulate

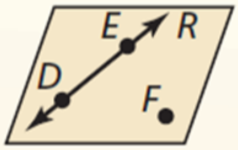
A plane contains at least three noncollinear points.



Through points D, E, and F, there is exactly one plane, plane R. Plane R contains at least three noncollinear points.

2.6 Plane-Line Postulate

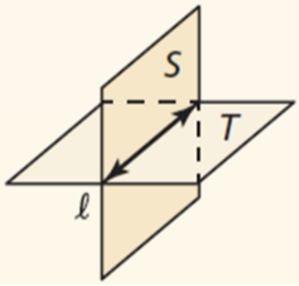
If two points lie in a plane, then the line containing them lies in the plane.



Points D and E lie in plane R, so $\overleftrightarrow{DE}$ lies in plane R.

2.7 Plane Intersection Postulate

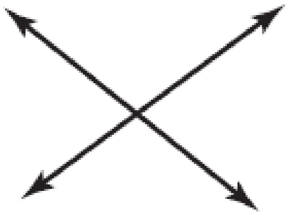
If two planes intersect, then their intersection is a line.



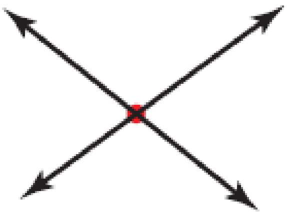
The intersection of plane S and plane T is line ℓ.

State the postulate illustrated by the diagram.

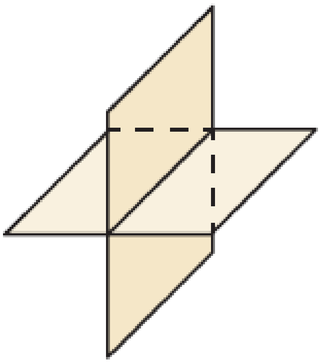
a. If



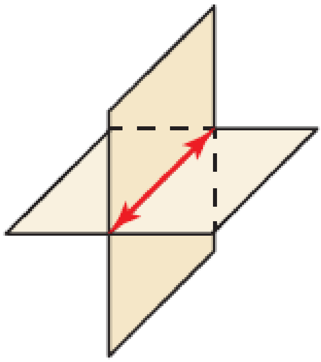
then



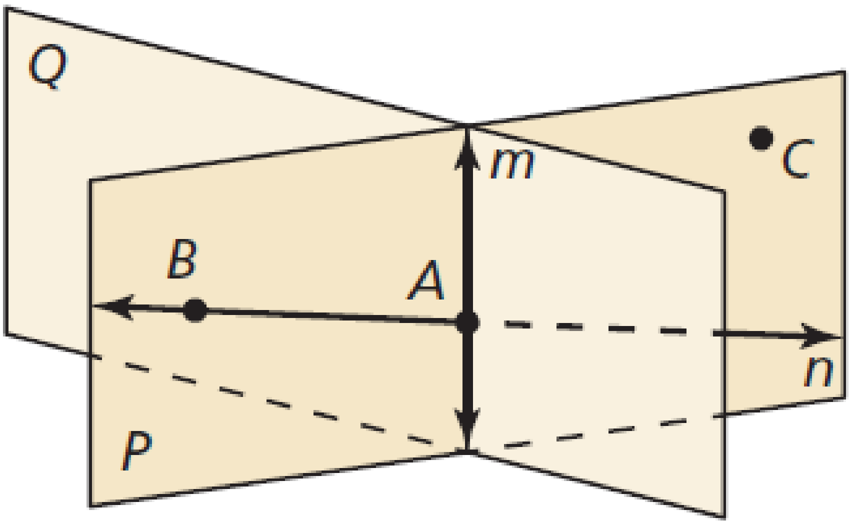
b. If



then



Use the diagram to write examples of the Plane-Point Postulate and the Plane-Line Postulate.



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

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

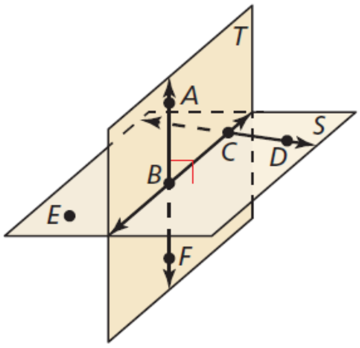
Points *A*, *B*, and *F* are collinear.

Points *E*, *B*, and *D* are collinear.

$\overleftrightarrow{AB} \perp$ plane *S*

$\overleftrightarrow{CD} \perp$ plane *T*

$\overleftrightarrow{AF}$ intersects $\overleftrightarrow{BC}$ at point *B*.



Core Concept

Algebraic Properties of Equality

Let a, b, and c be real numbers.

Addition Property of Equality	If $a = b$, then $a + c = b + c$.
Subtraction Property of Equality	If $a = b$, then $a - c = b - c$.
Multiplication Property of Equality	If $a = b$, then $a \cdot c = b \cdot c, c \neq 0$.
Division Property of Equality	If $a = b$, then $\frac{a}{c} = \frac{b}{c}, c \neq 0$.
Substitution Property of Equality	If $a = b$, then a can be substituted for b (or b for a) in any equation or expression.

Core Concept

Reflexive, Symmetric, and Transitive Properties of Equality

	Real Numbers	Segment Lengths	Angle Measu
Reflexive Property	$a = a$	$AB = AB$	$m\angle A = m\angle$
Symmetric Property	If $a = b$, then $b = a$.	If $AB = CD$, then $CD = AB$.	If $m\angle A = m\angle B$, then $m\angle B = m$
Transitive Property	If $a = b$ and $b = c$, then $a = c$.	If $AB = CD$ and $CD = EF$, then $AB = EF$.	If $m\angle A = m\angle B$ and $m\angle B = m\angle$ then $m\angle A = m$