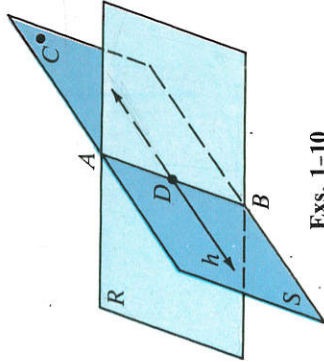


Written Exercises

Classify each statement as true or false.

- A**
- \overleftrightarrow{AB} is in plane R .
 - S contains \overleftrightarrow{AB} .
 - Plane R intersects plane S in \overleftrightarrow{AB} .
 - Point C is in R and S .
 - R and S contain D .
 - D is on line h .
 - h is in S .
 - h is in R .
 - A , B , and C are collinear.
 - A , B , C , and D are coplanar.

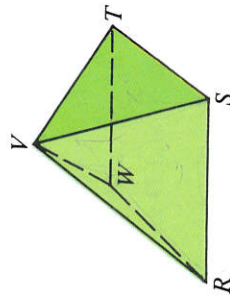


Exs. 1-10

- Make a sketch showing four coplanar points, no three of which are collinear.
 - Make a sketch showing four points that are not coplanar.

A plane can be named by three noncollinear points it contains. In Chapter 10 you will study *pyramids* like the one shown at the right below.

- Name five planes that contain sides of the pyramid shown.



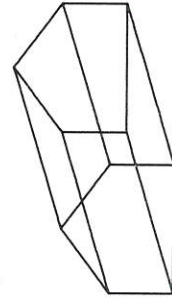
Exs. 12-18

- Of the five planes containing sides of the pyramid, are there any that do not intersect?
- Name three lines that intersect at point R .
- Name two planes that intersect in \overleftrightarrow{ST} .
- Name three planes that intersect at S .
- Name a line and a plane that intersect in a point.
- Name a line and a plane whose intersection is the line.

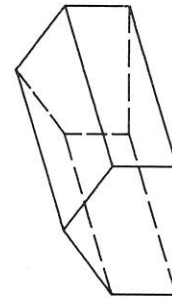
- To practice drawing figures in space, follow the three steps below to draw a diagram of a barn. (As you gain more practice in drawing figures in space, you will probably be able to go directly from Step 1 to Step 3.)



Step 1



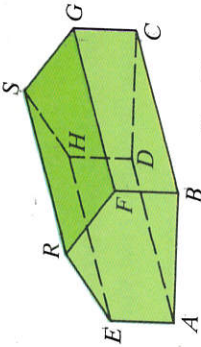
Step 2



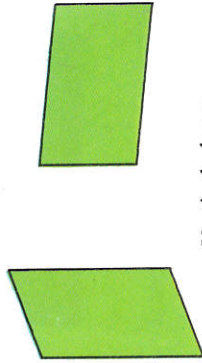
Step 3

- Name two planes that intersect in \overleftrightarrow{FG} .
- Name three lines that intersect at E .
- Name three planes that intersect at B .
- Are points A , D , and C collinear?
 - Are A , D , and C coplanar?
- Are points R , S , G , and F coplanar?
 - Are points R , S , G , and C coplanar?
- Name two planes that do not intersect.
 - Name two other planes that do not intersect.

Exs. 20-25



You can think of the ceiling and floor of a room as parts of *horizontal planes*. The walls are parts of *vertical planes*. Vertical planes are represented by figures like those shown in which two sides are vertical. A horizontal plane is represented by a figure having two sides horizontal and no sides vertical.



Vertical planes



Horizontal plane

- B**
- Can two horizontal planes intersect?
 - Can two vertical planes intersect?

Sketch and label the figures described. Use dashes for parts hidden from view.

- C**
- Vertical line l intersects a horizontal plane M at point O .
 - Horizontal plane P contains two lines k and n that intersect at point A .
 - Horizontal plane Q and vertical plane N intersect.
 - Vertical planes X and Y intersect in \overleftrightarrow{AB} .
 - Three vertical planes intersect in a line.
 - Point P is not in plane N . Three lines through P intersect N in points A , B , and C .
 - Two horizontal planes intersect a vertical plane in lines l and n .
 - Three planes intersect in a point.

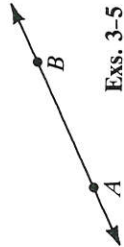


Classroom Exercises

- What does each symbol represent?
a. \overleftrightarrow{PQ} b. \overrightarrow{PQ} c. \overleftarrow{PQ} d. PQ
- How many endpoints does a segment have? a ray? a line?
- Is \overleftrightarrow{AB} the same as \overleftrightarrow{BA} ?
- Is \overrightarrow{AB} the same as \overrightarrow{BA} ?
- Is \overleftarrow{AB} the same as \overleftarrow{BA} ?
- What is the coordinate of P ? of R ?
- Name the point with coordinate 2.
- Find each distance: a. RS b. RQ c. PT
- Name three segments congruent to \overline{PQ} .
- Name the ray opposite to \overrightarrow{RQ} .
- Name the midpoint of \overline{RT} .
- What number is halfway between 1 and 2?
- What is the coordinate of the midpoint of \overline{ST} ?
- Could you list all the numbers between 1 and 2?
- Is there a point on the number line for every number between 1 and 2?
- Is there any limit to the number of points on the number line between S and T ?
- Simplify: a. $|-4|$ b. $|5 - (-2)|$ c. $|-7 - 12|$ d. $|-9 - (-6)|$



Exs. 6-16



Exs. 3-5

- The numbers given are the coordinates of two points on a number line. State the distance between the points.
18. -5 and 12 19. -5 and -15 20. $3\frac{1}{3}$ and $6\frac{2}{3}$

Written Exercises

- The numbers given are the coordinates of two points on a number line. State the distance between the points.
- 6 and 9 2. -3 and -17 3. -1.2 and -5.7 4. -2.5 and 4.6
- In the diagram, \overleftrightarrow{HL} and \overleftrightarrow{KT} intersect at the midpoint of \overline{LH} . Classify each statement as true or false.
-
- $\overline{LM} \cong \overline{MH}$
 - \overline{MT} bisects \overline{LH} .
 - \overline{KM} must equal \overline{MT} .
 - \overleftrightarrow{KT} is a bisector of \overline{LH} .
 - \overline{MT} and \overline{TM} are opposite rays.
 - \overline{LH} contains only three points.
 - \overleftrightarrow{KT} is the same as \overleftrightarrow{KM} .
 - \overleftrightarrow{KT} is the same as \overleftrightarrow{KM} .
 - $\overline{HM} + \overline{ML} = \overline{HL}$
 - $\overline{TM} + \overline{MH} = \overline{TH}$

Name each of the following.

- The point on \overleftrightarrow{DA} whose distance from D is 2
- The point on \overleftrightarrow{DG} whose distance from D is 2
- Two points whose distance from E is 2
- The ray opposite to \overrightarrow{BE}
- The midpoint of \overline{BF}
- The coordinate of the midpoint of \overline{AE}
- The coordinate of the midpoint of \overline{BD}
- A segment congruent to \overline{AF}

Exs. 17-24

In Exercises 25-28, draw \overline{CD} and \overline{RS} so that the conditions are satisfied.

- \overline{CD} and \overline{RS} intersect, but neither segment bisects the other.
- \overline{CD} and \overline{RS} bisect each other.
- \overline{CD} bisects \overline{RS} , but \overline{RS} does not bisect \overline{CD} .
- \overline{CD} and \overline{RS} do not intersect, but \overline{CD} and \overline{RS} do intersect.

B In the diagram, $\overline{PR} \cong \overline{RT}$, S is the midpoint of \overline{RT} , $QR = 4$, and $ST = 5$. Complete.

- $KS = ?$
 - $RT = ?$
 - $PR = ?$
 - $PQ = ?$
- In the diagram, X is the midpoint of \overline{VZ} , $VW = 5$, and $VY = 20$. Find the coordinates of W , X , and Y .

E is the midpoint of \overline{DF} . Find the value of x .

- $DE = 5x + 3$, $EF = 33$
- $DE = 45$, $EF = 5x - 10$
- $DE = 3x$, $EF = x + 6$
- $DE = 2x - 3$, $EF = 5x - 24$

Exs. 31-38

Find the value of y .

- $GE = y$, $EH = y - 1$, $GH = 11$
- $GE = 3y$, $GH = 7y - 4$, $EH = 24$

Find the value of z . Then find \overline{GE} and \overline{EH} and state whether E is the midpoint of \overline{GH} .

- $GE = z + 2$, $GH = 20$, $EH = 2z - 6$
 - $GH = z + 6$, $EH = 2z - 4$, $GE = z$
- On \overline{AB} , how many points are there whose distance from point A is 10 cm?
 - On \overline{AB} , how many points are there whose distance from point A is 10 cm?
- On \overline{AB} , how many points are there whose distance from point B is 10 cm?