Lesson Reading Guide

Chapter 1

Glencoe Geometry

NAME ______________________________ DATE ____________ PERIOD _____

1-1 Lesson Reading Guide

Points, Lines, and Planes

Get Ready for the Lesson

Read the introduction to Lesson 1-1 in your textbook.

- Find three pencils of different lengths and hold them upright on your desk so that the three pencil points do not lie along a single line. Can you place a flat sheet of paper or cardboard so that it touches all three pencil points?
- How many ways can you do this if you keep the pencil points in the same position?
- How will your answer change if there are four pencil points?

Read the Lesson

1. Complete each sentence.
   a. Points that lie on the same line are called ____________ points.
   b. Points that do not lie in the same plane are called ____________ points.
   c. There is exactly one ____________ through any two points.
   d. There is exactly one ____________ through any three noncollinear points.

2. Refer to the figure at the right. Indicate whether each statement is true or false.
   a. Points $A$, $B$, and $C$ are collinear.
   b. The intersection of plane $ABC$ and line $m$ is point $P$.
   c. Line $\ell$ and line $m$ do not intersect.
   d. Points $A$, $P$, and $B$ can be used to name plane $\mathcal{U}$.
   e. Line $\ell$ lies in plane $ACB$.

3. Complete the figure at the right to show the following relationship: Lines $\ell$, $m$, and $n$ are coplanar and lie in plane $Q$. Lines $\ell$ and $m$ intersect at point $P$. Line $n$ intersects line $m$ at $R$, but does not intersect line $\ell$.

Remember What You Learned

4. Recall or look in a dictionary to find the meaning of the prefix co-. What does this prefix mean? How can it help you remember the meaning of collinear?
Study Guide and Intervention

Points, Lines, and Planes

Name Points, Lines, and Planes In geometry, a point is a location, a line contains points, and a plane is a flat surface that contains points and lines. If points are on the same line, they are collinear. If points on are the same plane, they are coplanar.

Example Use the figure to name each of the following.

a. a line containing point A
The line can be named as $\ell$. Also, any two of the three points on the line can be used to name it.
$AB, AC$, or $BC$

b. a plane containing point D
The plane can be named as plane $\mathcal{N}$ or can be named using three noncollinear points in the plane, such as plane $ABD$, plane $ACD$, and so on.

Exercises

Refer to the figure.

1. Name a line that contains point A.

2. What is another name for line $m$?

3. Name a point not on $AC$.

4. Name the intersection of $AC$ and $DB$.

5. Name a point not on line $\ell$ or line $m$.

Draw and label a plane $Q$ for each relationship.

6. $AB$ is in plane $Q$.

7. $ST$ intersects $AB$ at $P$.

8. Point $X$ is collinear with points $A$ and $P$.

9. Point $Y$ is not collinear with points $T$ and $P$.

10. Line $\ell$ contains points $X$ and $Y$. 

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Chapter 1

Glencoe Geometry
Points, Lines, and Planes in Space  

Space is a boundless, three-dimensional set of all points. It contains lines and planes.

**Example**

a. How many planes appear in the figure?
   
   There are three planes: plane \( \mathcal{N} \), plane \( O \), and plane \( P \).

b. Are points \( A \), \( B \), and \( D \) coplanar?
   
   Yes. They are contained in plane \( O \).

**Exercises**

Refer to the figure.

1. Name a line that is not contained in plane \( \mathcal{N} \).

2. Name a plane that contains point \( B \).

3. Name three collinear points.

Refer to the figure.

4. How many planes are shown in the figure?

5. Are points \( B \), \( E \), \( G \), and \( H \) coplanar? Explain.

6. Name a point coplanar with \( D \), \( C \), and \( E \).

Draw and label a figure for each relationship.

7. Planes \( M \) and \( \mathcal{N} \) intersect in \( \overline{HJ} \).

8. Line \( r \) is in plane \( \mathcal{N} \), line \( s \) is in plane \( M \), and lines \( r \) and \( s \) intersect at point \( J \).

9. Line \( t \) contains point \( H \) and line \( t \) does not lie in plane \( M \) or plane \( \mathcal{N} \).
1-1 Skills Practice

Points, Lines, and Planes

Refer to the figure.

1. Name a line that contains point D.

2. Name a point contained in line n.

3. What is another name for line p?

4. Name the plane containing lines n and p.

Draw and label a figure for each relationship.

5. Point K lies on RT.

6. Plane J contains line s.

7. YP lies in plane B and contains point C, but does not contain point H.

8. Lines q and f intersect at point Z in plane U.

Refer to the figure.

9. How many planes are shown in the figure?

10. How many of the planes contain points F and E?

11. Name four points that are coplanar.

Chapter 1

1-1 Practice

Points, Lines, and Planes

Refer to the figure.

1. Name a line that contains points \( T \) and \( P \).

2. Name a line that intersects the plane containing points \( Q, N, \) and \( P \).

3. Name the plane that contains \( \overline{TN} \) and \( \overline{QR} \).

Draw and label a figure for each relationship.

4. \( \overline{AK} \) and \( \overline{CG} \) intersect at point \( M \) in plane \( T \).

5. A line contains \( L(-4, -4) \) and \( M(2, 3) \). Line \( q \) is in the same coordinate plane but does not intersect \( LM \). Line \( q \) contains point \( N \).

Refer to the figure.

6. How many planes are shown in the figure?

7. Name three collinear points.


VISUALIZATION Name the geometric term(s) modeled by each object.

9. \[
\begin{array}{c}
\text{STOP} \\
\end{array}
\]

10. tip of pin

11. \[
\begin{array}{c}
\text{strings} \\
\end{array}
\]

12. a car antenna

13. a library card
1-1 Word Problem Practice

Points, Lines, and Planes

1. **STREETS** The map shows some of the roads in downtown Little Rock. Lines are used to represent streets and points are used to represent intersections. Four of the street intersections are labeled. What street corresponds to line AB?

2. **FLYING** Marsha plans to fly herself from Gainsville to Miami. She wants to model her flight path using a straight line connecting the two cities on the map. Sketch her flight path on the map shown below.

3. **MAPS** Nathan’s mother wants him to go to the post office and the supermarket. She tells him that the post office, the supermarket and their home are collinear, and the post office is between the supermarket and their home. Make a map showing the three locations based on this information.

4. **ARCHITECTURE** An architect models the floor, walls, and ceiling of a building with planes. To locate one of the planes that will represent a wall, the architect starts by marking off two points in the plane that represents the floor. What further information can the architect give to specify the plane that will represent the wall?

CONSTRUCTION For Exercises 5 and 6, use the following information.

Mr. Riley gave his students some rods to represent lines and some clay to show points of intersection. Below is the figure Lynn constructed with all of the points of intersection and some of the lines labeled.

5. What is the intersection of lines k and n?

6. Name the lines that intersect at point C.

7. Are there 3 points that are collinear and coplanar? If so, name them.