LESSON 1-1
Understanding Points, Lines, and Planes

Use the figure for Exercises 1–7.

1. Name a plane. ________________________________

2. Name a segment. ________________________________

3. Name a line. ________________________________

4. Name three collinear points. ________________________________

5. Name three noncollinear points. ________________________________

6. Name the intersection of a line and a segment not on the line. ________________________________

7. Name a pair of opposite rays. ________________________________

Use the figure for Exercises 8–11.

8. Name the points that determine plane \( \mathcal{R} \). ________________________________

9. Name the point at which line \( m \) intersects plane \( \mathcal{R} \). ________________________________

10. Name two lines in plane \( \mathcal{R} \) that intersect line \( m \). ________________________________

11. Name a line in plane \( \mathcal{R} \) that does not intersect line \( m \). ________________________________

Draw your answers in the space provided.

Michelle Kwan won a bronze medal in figure skating at the 2002 Salt Lake City Winter Olympic Games.

12. Michelle skates straight ahead from point \( L \) and stops at point \( M \). Draw her path.

13. Michelle skates straight ahead from point \( L \) and continues through point \( M \). Name a figure that represents her path. Draw her path.

14. Michelle and her friend Alexei start back to back at point \( L \) and skate in opposite directions. Michelle skates through point \( M \), and Alexei skates through point \( K \). Draw their paths.
Practice A

Understanding Points, Lines, and Planes

Use the figure for Exercises 1–3.
1. Name two points that determine line \( AC \).
2. Name a point that is NOT collinear with point \( A \) and point \( C \).
3. Name the points that determine plane \( ABC \).

Use the figure for Exercises 8–10.
8. A line segment is a part of a line and has two endpoints. Name the endpoints of \( TU \).
9. Find the number of endpoints of \( UV \).
10. A ray is a part of a line that has one endpoint. Name the endpoint of \( UV \).

11. A constellation is a group of stars that people use to make a picture. The seven stars make the Big Dipper. Draw \( DE, FE, FG, GH, HI, JG, \) and \( JI \) to complete the picture.

12. Points \( P \) and \( Q \) lie in a plane. Of \( PQ, PG, \) or \( PQ, \) name the one that has no endpoints.

Practice B

Understanding Points, Lines, and Planes

Use the figure for Exercises 1–7.
1. Name a pair of points that are collinear with point \( B \) and \( C \).
2. Name a segment. \( BD, BC, BE, \) or \( CE \)
3. Name a line. \( EC, BC, BE \)
4. Name three collinear points. \( B, C, \) and \( E \)
5. Name three noncollinear points. Possible answers: points \( B, C, \) and \( D \) or points \( B, E, \) and \( D \)
6. Name the intersection of a line and a segment not on the line. \( point \ B \)
7. Name a pair of opposite rays. \( BC \) and \( BE \)

Use the figure for Exercises 8–11.
8. Name the points that determine plane \( \pi \).
9. Name the point at which line \( m \) intersects plane \( \pi \) at point \( Z \).
10. Name two lines in plane \( \pi \) that intersect line \( m \).
11. Name a line in plane \( \pi \) that does not intersect line \( m \).

Draw your answers in the space provided.

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13. Michelle skates straight ahead from point \( L \) and continues through point \( M \). Name a figure that represents her path. Draw her path.
14. Michelle and her friend Alexei start back to back at point \( L \) and skate in opposite directions. Michelle skates through point \( M \), and Alexei skates through point \( K \). Draw their paths.

Practice C

Understanding Points, Lines, and Planes

Use the figure for Exercises 1–3.
1. This is plane \( HU \). Explain why this statement is incorrect.
2. Name the plane.
3. Give six names for the line. \( HI, HI, HJ, IH, JH, \) and \( JI \).

4. Explain why \( ST \) and \( TS \) are or are not the same figure. \( ST \) and \( TS \) are not the same figure because \( ST \) has its endpoint at \( S \) and \( TS \) has its endpoint at \( T \).
5. Explain why \( ST \) and \( TS \) are or are not opposite rays. \( ST \) and \( TS \) are not opposite rays because they do not have the same endpoint.
6. Imagine \( ST \) and \( TS \) drawn in the same plane. Taken together, what kind of figure do the rays form? a line
7. Give three undefined terms in geometry. point, line, plane

Postulates are basic true statements accepted without proof. Each statement below is incorrect. Rewrite each statement so that it is true.
8. Through any three points there is exactly one plane containing them.

Through any three noncollinear points there is exactly one plane containing them.
9. If two points intersect, then they intersect in exactly one plane.

If two planes intersect, then they intersect in exactly one plane.

Draw your answer in the space provided.
10. Window glass is transparent, so visible light passes through it. Imagine a double-paned window as two nonintersecting planes and sunlight as a line. Use sketches to show that a line contained in neither of the planes must intersect both or neither of the two planes.