

Points, Lines, Line Segments, and Rays

A point marks a location. A line goes forever in two directions. A segment has two endpoints. A ray has one endpoint and goes forever in the other direction.

| Term | Endpoints | Goes forever? | Symbol |
|--------------|-----------|-----------------|---------------------------|
| Point | — | no | $\cdot A$ |
| Line | 0 | yes (both ways) | \overleftrightarrow{AB} |
| Line segment | 2 | no | \overline{AB} |
| Ray | 1 | yes (one way) | \overrightarrow{AB} |

Key Concepts

1. A **point** is an exact location. It has no size.
2. A **line** goes on forever in both directions. It's drawn with arrows on both ends.
3. A **line segment** has two endpoints and a fixed length.
4. A **ray** starts at one point and goes on forever in one direction. Think of a flashlight beam.

Worked Examples

① What has two endpoints and does not go on forever?

 Two endpoints + finite length = line segment.

 **Answer:** *Line segment*

② How many endpoints does a ray have?

 A ray starts at one point and goes forever in one direction. So 1 endpoint.

 **Answer:** 1

③ Name a real-life example of a line segment.

 Anything with a definite start and a definite end. Examples: the edge of a ruler, a pencil, the side of a desk, a piece of yarn.

 **Answer:** *The edge of a ruler*

Practice Problems

Match terms to definitions or identify symbols.

1. Two endpoints, fixed length \Rightarrow ?

2. Arrows on both ends \Rightarrow ?

3. One endpoint, goes forever \Rightarrow ?

4. An exact location, no size \Rightarrow ?

5. How many endpoints does a line have?

6. How many endpoints does a segment have?

7. \overleftrightarrow{AB} is a _____.

8. \overline{CD} is a _____.

9. \overrightarrow{EF} is a _____.

10. Does a ray have a fixed length? (Y/N)

11. Does a line segment have a fixed length? (Y/N)

12. Name a real-life example of a ray. _____

Study Tips

- 👉 Look at the symbol above the letters: \overline{AB} has no arrows (segment), \overrightarrow{AB} has one arrow (ray), \overleftrightarrow{AB} has two arrows (line).
- 👉 “Goes forever” is the key idea for lines and rays. Anything you can measure with a ruler is a segment.
- 👉 Real-world examples help: a wall edge (segment), a flashlight beam (ray), an idealized straight road that never ends (line).

Word Problems

1. Tom draws a straight path from point A to point B on his paper. The path starts at A and stops at B . Is his drawing a line, a line segment, or a ray?

Answer: _____

2. A flashlight shines from one spot and the beam keeps going. Which geometric term best describes the beam?

Answer: _____

Answer Key — with Friendly Explanations

Practice Problems

1. Line segment.

 **Answer:** *Line segment*

2. Line.

 **Answer:** *Line*

3. Ray.

 **Answer:** *Ray*

4. Point.

 **Answer:** *Point*

5. Zero.

 **Answer:** *0*

6. Two.

 **Answer:** *2*

7. \overleftrightarrow{AB} = line.

 **Answer:** *Line*

8. \overline{CD} = line segment.

 **Answer:** *Line segment*

9. \overrightarrow{EF} = ray.

 **Answer:** *Ray*

10. No — it goes forever in one direction.

 **Answer:** *No*

11. Yes — both endpoints are defined.

 **Answer:** *Yes*

12. A flashlight beam, a laser pointer's beam, the path of a sunbeam.

 **Answer:** *Flashlight beam*

Word Problems

1. Two endpoints, fixed length: line segment.

 **Answer:** *Line segment*

2. One endpoint, continues one direction: ray.

 **Answer:** *Ray*

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