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 ⇒ ?

2. Arrows on both ends ⇒ ?

3. One endpoint, goes forever ⇒ ?

4. An exact location, no size ⇒ ?

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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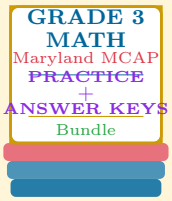

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