

## 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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