A **point** is represented by a dot and has a unique location. We use upper case letters to name points.

**Example 1**

![Diagram of points A, B, C, and D]

A **line** is an infinite set of points. (Symbol: $\overleftrightarrow{AB}$)

**Example 2**

![Diagram of lines]

Points that lie on the same line are called **collinear** (Symbol: $A \overleftrightarrow{X} B$) Points that do not lie on the same line are called **noncollinear**.

**Example 3**

![Diagram of lines]

**Postulate** is an unproved assumption.

**Postulate 1**: Through two distinct points there is exactly one line.

**Postulate 2**: If two lines intersect, then they intersect at a point.
Example 4

How many lines can be drawn through

1. point A?
2. both points A and B?
3. all points A, B, and C?
4. Where do $\overline{AB}$ and $\overline{AC}$ intersect?

A line segment is part of a line. (Symbol, $\overline{AB}$ where A and B are the endpoints)

Example 5

To measure segments we use rulers. Remember that there is a margin of error each time we use such a device.
The length of a segment $\overline{AB}$ is 5 cm. We write $AB = 5$.

Postulate 3: The measure of any line segments is a unique positive number.

Segments that have the same length are called congruent. (Symbol: $\cong$)

In diagrams we use identical tick marks to indicate congruent segments.

Example 6

Segment-Addition Postulate: If X is a point of $\overline{AB}$ and $A - X - B$, then $AX + XB = AB$.

Example 8
The **midpoint** of a line segment is the point that separates the line segment into two congruent parts.

**Theorem:** The midpoint of the segment is unique.

Example

$AB = 20$ cm and $M$ is the midpoint of the segment $AB$. How long is $AM$?

Example

$M$ is the midpoint of the segment $AB$. $AB = 3x + 24$ and $MB = 7x + 1$. Find $x$ and the length of the segment $AM$.

Example

$M$ is the midpoint of the segment $AB$. $AM = 3x + 4$ and $MB = x + 38$. Find $x$ and the length of the segment $AB$.

Example

$M$ is the midpoint of the segment $AB$ and $N$ is the midpoint of the segment $BM$. Find $AB$, if $MN = 3$.  