Review the main components of the coordinate plane as shown in the figure:

The coordinates of point \( R \) are \((-4, -1)\).

\[
\text{Examples:} \quad \begin{align*}
\text{A} & \ (\text{____}, \text{____}) \quad \text{B} \ (\text{____}, \text{____}) \quad \text{C} \ (\text{____}, \text{____}) \\
\text{D} & \ (\text{____}, \text{____}) \quad \text{E} \ (\text{____}, \text{____}) \quad \text{G} \ (\text{____}, \text{____})
\end{align*}
\]

Which quadrant contains the following points:

A: ______  B:_____  C:_____  D:_____  E:_____  G:_____

Graph the following points:

\[
\begin{align*}
\text{H} \ (7, 10) \quad \text{J} \ (-5, 12) \quad \text{K} \ (-1, -8)
\end{align*}
\]

To find distance between two points on a coordinate plane:

- If Horizontal or Vertical Line: Use Ruler Postulate (count the spaces between the points)
- Not a Horizontal or Vertical Line: Use Distance Formula or Pythagorean Theorem
EXAMPLE 1: Find the distance between \( T(5, 2) \) and \( R(4,1) \) to the nearest tenth.

EXAMPLE 2: Find \( PQ \) if \( P(-3,-5) \) and \( Q(-4, 6) \).

Note: When two segments have the same length, they are said to be congruent. For example, if \( AB = BC \), then we write \( \overline{AB} \cong \overline{BC} \), which is read “segment \( AB \) is congruent to segment \( BC \).”
**Midpoint: On a Number Line**

The coordinate of the midpoint is the AVERAGE of the coordinates of the endpoints

The midpoint between a and b is: \( \frac{a + b}{2} \)

**Example 3:** Find the midpoint between A and D.

**Midpoint: In the Coordinate Plane**

The coordinate of the midpoint between \((x_1, y_1)\) and \((x_2, y_2)\) is the average of the x coordinates and the average of the y coordinates:

\[ M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \]

**Example 4:** \(\overline{QS}\) has endpoints \(Q(3, 5)\) and \(S(7, -9)\).
Find the coordinates of its midpoint.

**Example 5:** \(\overline{CD}\) has endpoints \(C(-2, 12)\) and \(D(10, -4)\).
Find the coordinates of its midpoint.
Use the midpoint formula to find the missing endpoint in the following examples.

**Example 6:** The midpoint of $\overline{AB}$ is $M(3, 4)$. One endpoint is $A(-3, -2)$. Find the coordinates of the other endpoint $B$.

Step 1: Plug in everything given. Let the coordinates of $B$ be $(x_2, y_2)$.

Step 2: Set the $x$ coordinate on the left equal to the $x$ coordinate equation on the right. Do this for the $y$ coordinates also.

Step 3: Solve using algebra.

**Example 7:** The midpoint of $\overline{XY}$ has coordinates $(4, -6)$. $X$ has coordinates $(2, -3)$. Find the coordinates of $Y$. 