

Distance and Midpoint Formulas

Line Segment: Part of a line that has two endpoints. The line segment is named by these two endpoints.

Midpoint: The distance halfway between two points

Segment Bisector: A line that cuts a second line directly in half (located at the midpoint).

The Distance Formula	The Midpoint Formula

Example 1:

What is the distance between points (1, 1) and (7, 9)?

The Distance Formula

Find the distance between each of the following points.

a) R(5, 1) and S(-3, -3)

b) T(0, 0) and P(12, 8)

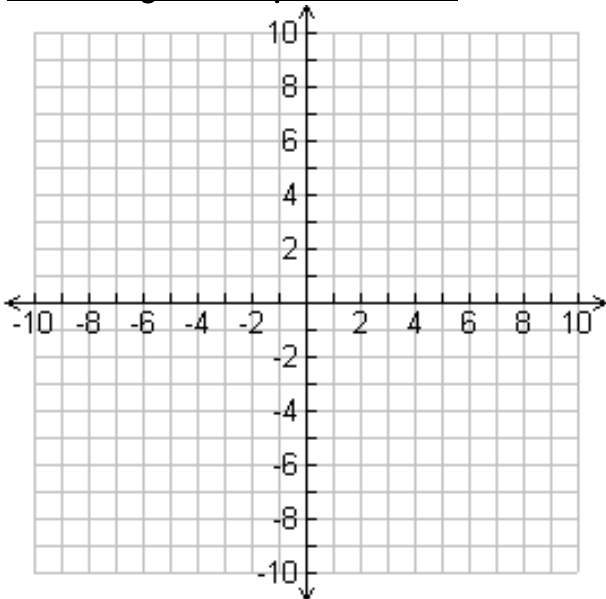
c) J (-1, 3) and K (11, 2)

d) A (2, 1) and B (6, 4)

e) A triangle has vertices at (1, 3), (2, -3) and (-1, -1). What is the approximate perimeter of the triangle?
Draw a picture to help.

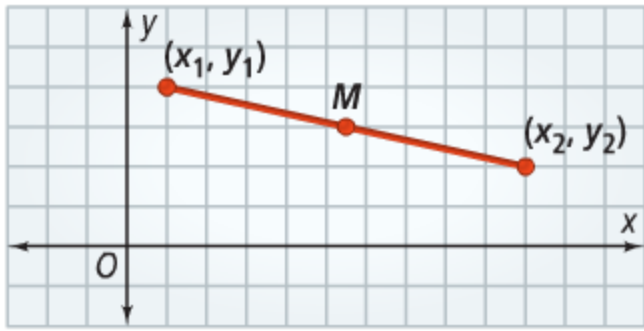
Discovering The Midpoint Formula: Find the midpoint between each of the following points.

a) E (-2, 6) and F (10, -8) – use the graph to the left.



b) M(11, -2) and N(-9, 13)

c) R is the midpoint of segment \overline{PS} . Q is the midpoint of segment \overline{RS} . P is located at (8, 10) and S is located at (12, -6). What are the coordinates of Q? *Draw and label a picture to help.*



The midpoint of a line segment is the point M on the segment that is the same distance from each endpoint, (x_1, y_1) and (x_2, y_2) . The coordinates of M are given by the midpoint formula.

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

Example 2:

What is the midpoint of line segment with end points (3, 6) and (-5, 1)?

Practice:

Find the midpoint of the line segment joining the two points.

1. $(-1, 3), (11, -2)$

2. $(2, 1), (6, 4)$

3. $(-4, 1), (11, 9)$

Midpoint Formula: Working It Backwards

Split Formula in Two:

1. Plug in what you know
2. Solve for x_2

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2. Solve for x_2

Find the coordinates of C if B (4, 3) is the midpoint of AC and A is located at (6, -12).

Putting it Together

What is the approximate length of the segment \overline{CD} if \overline{CD} bisects \overline{AB} at C and A (3, 5), B (7, -3), and D (-4, 2)?
Draw and label a picture to help