



Midpoint and Distance in the Coordinate Plane

UNIT 1 LESSON 7

Midpoint and Distance in the Coordinate Plane

STUDENTS WILL BE ABLE TO:

- FIND THE MIDPOINT OF A SEGMENT
- FIND THE DISTANCE BETWEEN TWO POINTS IN THE COORDINATE PLANE

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WHAT DO YOU THINK WE MEAN
BY THE WORD “MIDPOINT”?

IDEAS ON HOW TO FIND IT ON A NUMBER LINE?

IDEAS ON HOW TO FIND IT ON A COORDINATE PLANE?

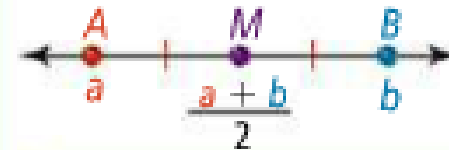
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YOU CAN USE FORMULAS TO FIND THE MIDPOINT AND LENGTH OF ANY SEGMENT IN THE COORDINATE PLANE.

On a Number Line

The coordinate of the midpoint is the *average* or *mean* of the coordinates of the endpoints.

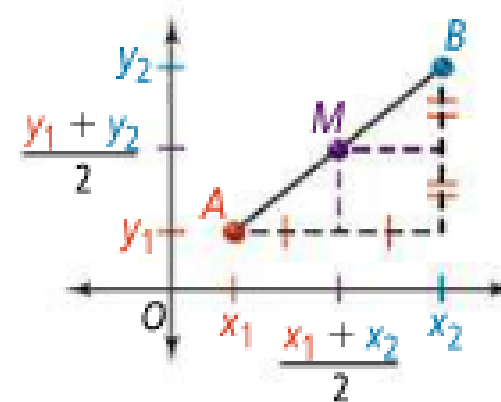
The coordinate of the midpoint M of \overline{AB} is $\frac{a + b}{2}$.



In the Coordinate Plane

The coordinates of the midpoint are the average of the x -coordinates and the average of the y -coordinates of the endpoints.

Given \overline{AB} where $A(x_1, y_1)$ and $B(x_2, y_2)$, the coordinates of the midpoint of \overline{AB} are $M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.



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PROBLEM 1:

SEGMENT AB HAS ENDPOINTS AT -4 AND 9 . WHAT IS THE COORDINATE OF ITS MIDPOINT?

SEGMENT JK HAS ENDPOINTS AT -12 AND 4 ON A NUMBER LINE. WHAT IS THE COORDINATE OF ITS MIDPOINT?

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PROBLEM 1B:

SEGMENT EF HAS ENDPOINTS $E(7, 5)$ AND $F(2, -4)$. WHAT ARE THE COORDINATES OF ITS MIDPOINT M ?

SEGMENT RS HAS ENDPOINTS AT $R(5, -10)$ AND $S(3, 6)$.
WHAT ARE THE COORDINATES OF ITS MIDPOINT M ?

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PROBLEM 2:

THE MIDPOINT OF SEGMENT CD IS $M(2, -1)$. ONE ENDPOINT IS $C(-5, 7)$. WHAT ARE THE COORDINATES OF THE OTHER ENDPOINT D?

THE MIDPOINT OF SEGMENT AB IS $M(4, -9)$. ONE ENDPOINT IS $A(-3, -5)$. WHAT ARE THE COORDINATES OF THE OTHER ENDPOINT B?

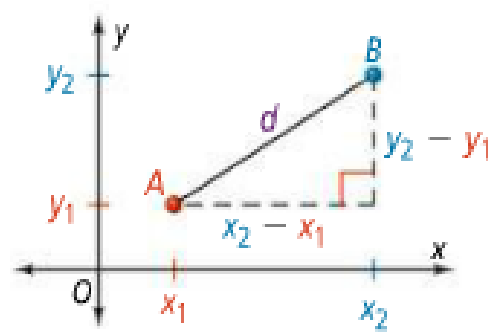
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TO FIND THE DISTANCE BETWEEN ANY TWO POINTS IN A COORDINATE PLANE, YOU CAN USE THE DISTANCE FORMULA.

take note

Key Concept Distance Formula

The distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ is

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}.$$


DO YOU REMEMBER ANY OTHER WAY TO FIND THE DISTANCE BETWEEN TWO COORDINATE POINTS IN A PLANE?

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PROBLEM 3:

WHAT IS THE DISTANCE BETWEEN $U(-7, 5)$ AND $V(4, -3)$?
ROUND TO THE NEAREST TENTH.

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PROBLEM 3:

SEGMENT SR HAS ENDPOINTS $S(-2, 14)$ AND $R(3, -1)$. WHAT IS SR TO THE NEAREST TENTH?