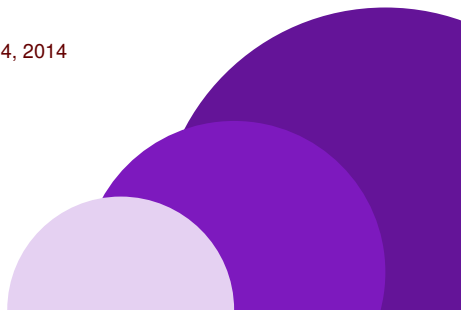


Core 1

2014 - 2015

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September 14, 2014

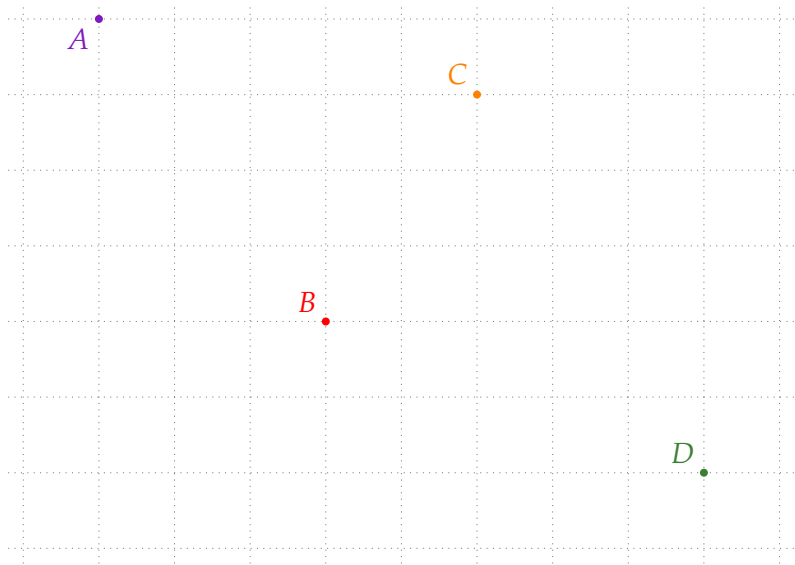


geometry of straight lines

distance between two points

Shortest Distance

Find the shortest distance between all pairs of points



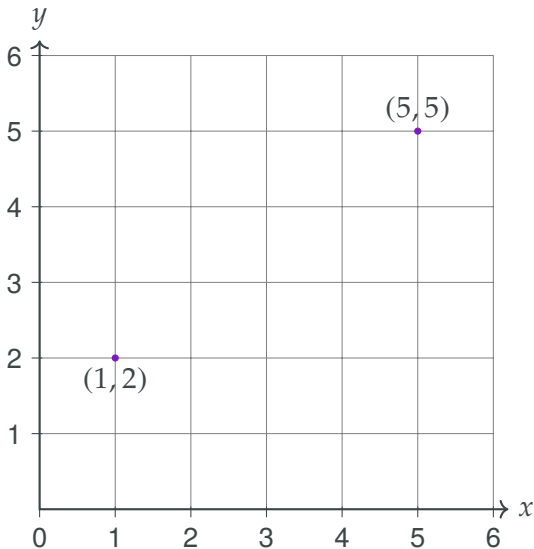
Example

Example 1

Find the shortest distance between the points $(1, 2)$ and $(5, 5)$.

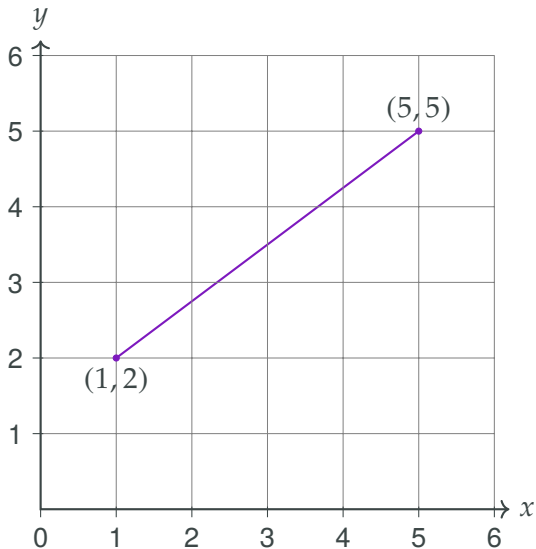
Example

Find the shortest distance numerically



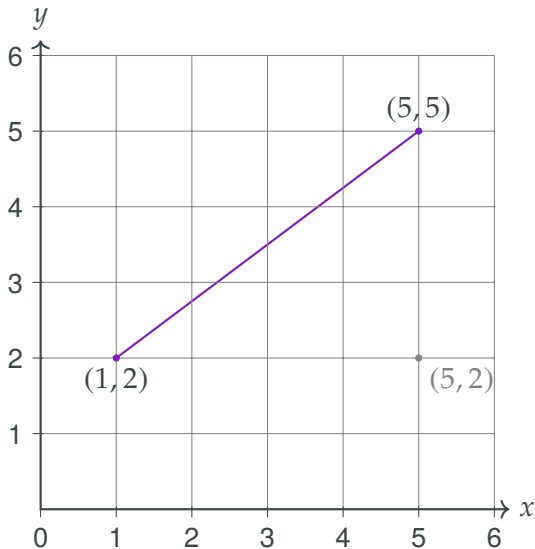
Example

Find the shortest distance numerically



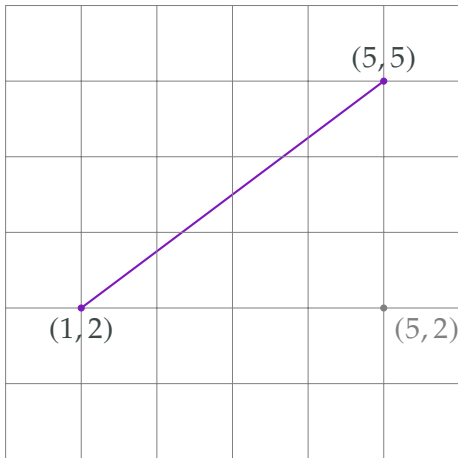
Example

Find the shortest distance numerically



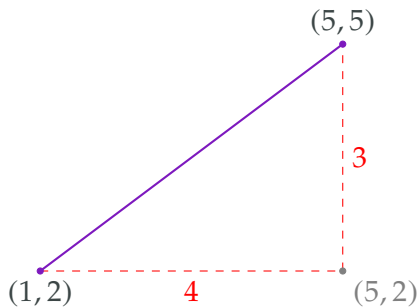
Example

Find the shortest distance numerically

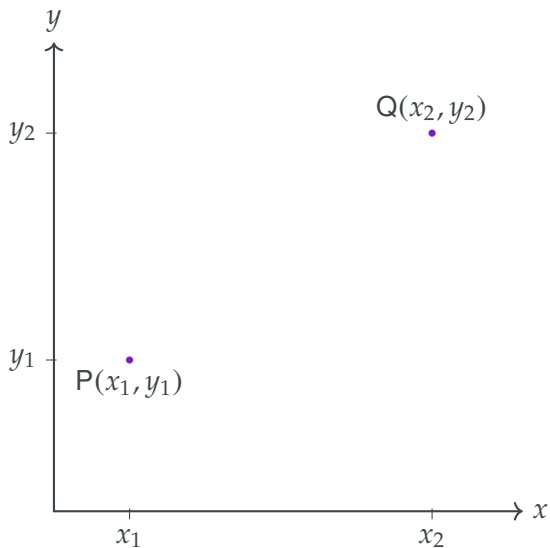


Example

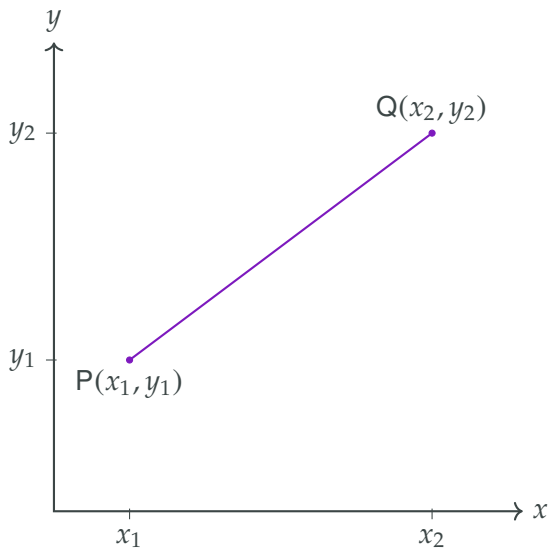
Find the shortest distance numerically



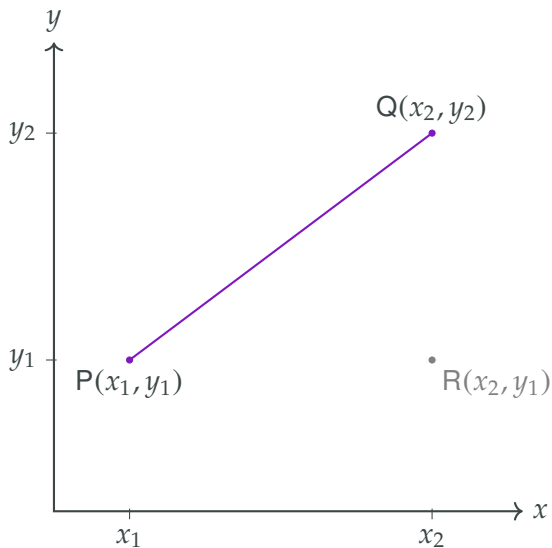
Algebraically



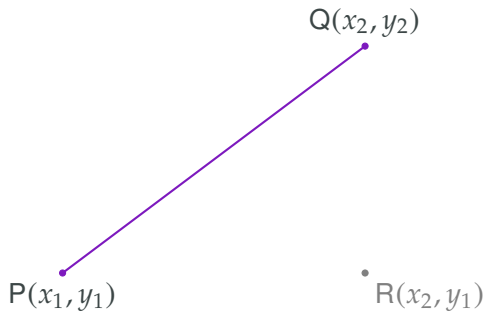
Algebraically



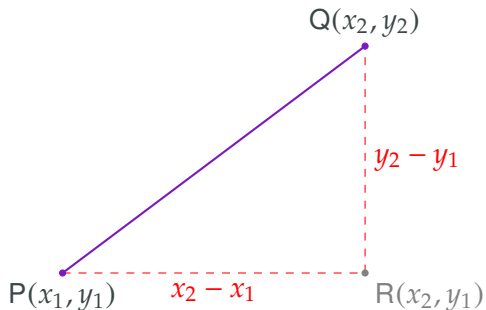
Algebraically



Algebraically



Algebraically



Distance between two points

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

Example

Example 2

Find the shortest distance between $(-2, 3)$ and $(4, -5)$.

Example

Example 2

Find the shortest distance between $(-2, 3)$ and $(4, -5)$.

10

midpoints

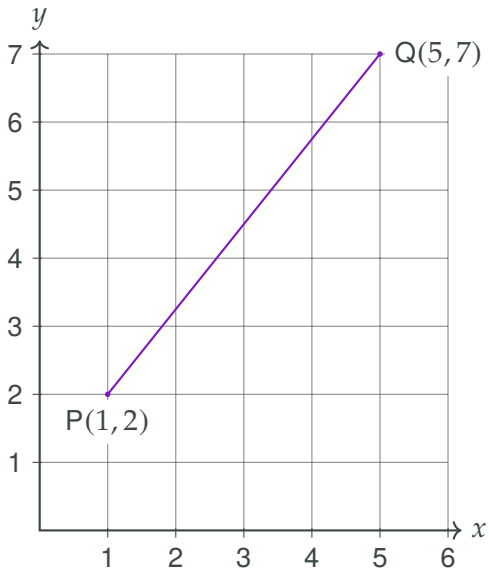
Example

Example 3

Find the midpoint of the line segment connecting the points $W(1, 2)$ and $Z(5, 7)$.

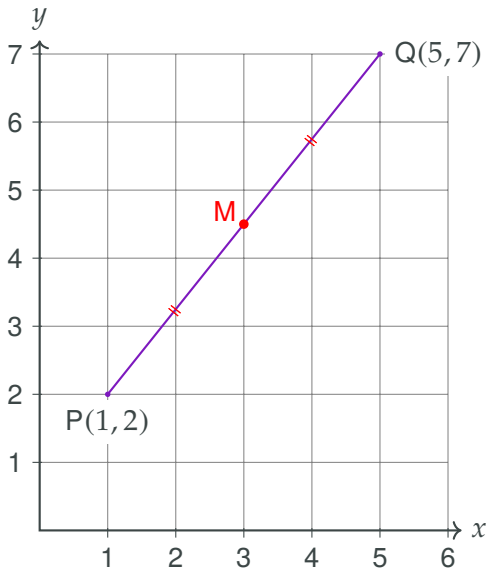
Example

Find the midpoint numerically



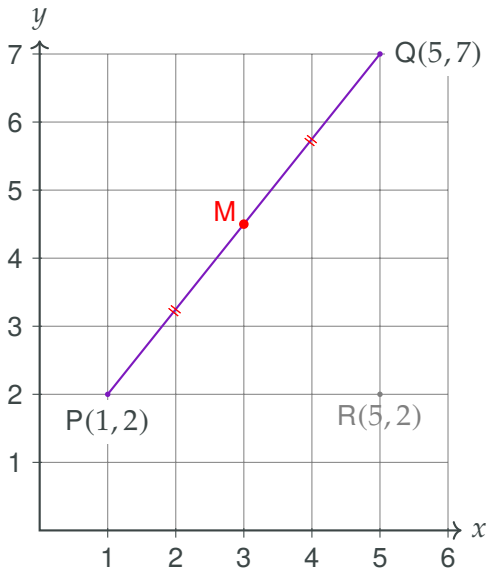
Example

Find the midpoint numerically



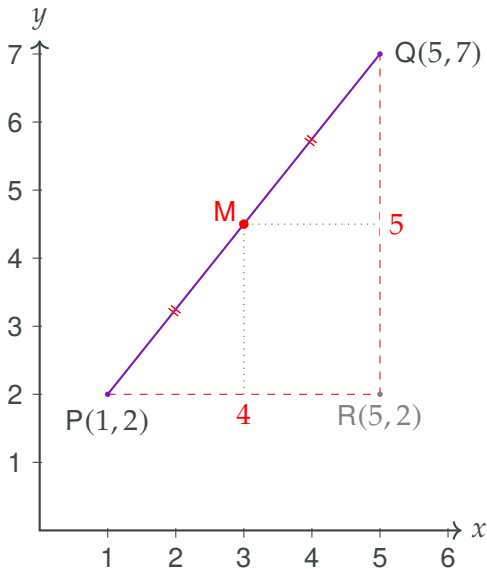
Example

Find the midpoint numerically

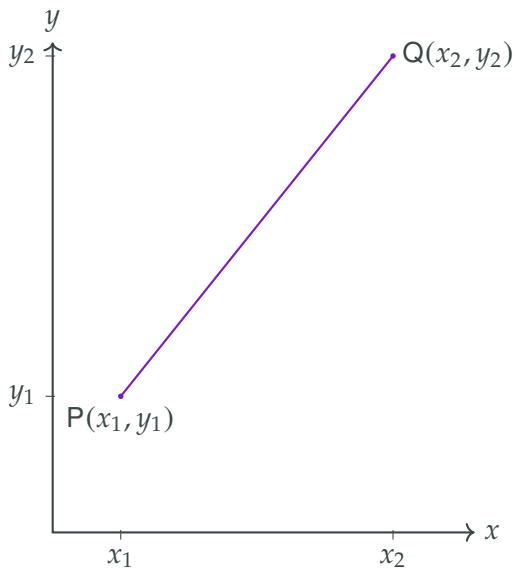


Example

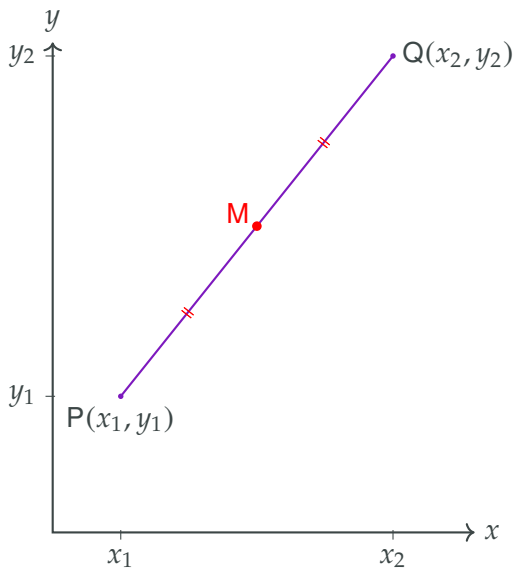
Find the midpoint numerically



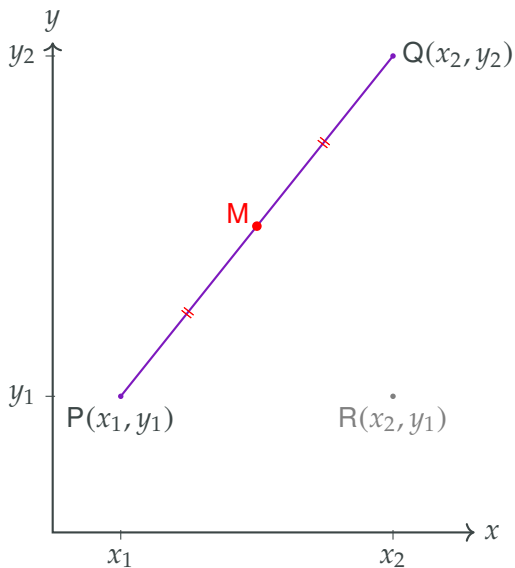
Algebraically



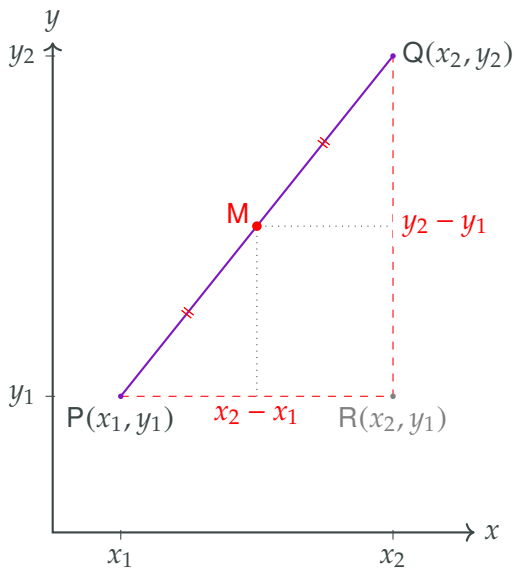
Algebraically



Algebraically



Algebraically



Midpoints

General formula

The **midpoint** of a line segment is the average of the two end coordinates

Midpoints

The midpoint of the line segment joining (x_1, y_1) and (x_2, y_2) is

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

Example

Example 4

M is the midpoint of the line segment joining $A(1, -3)$ to $B(3, 4)$.

- Find the coordinates of M .
- M is also the midpoint of the line segment CD , where $C(1, 3)$. Find the coordinates of D .

Example

Example 4

M is the midpoint of the line segment joining $A(1, -3)$ to $B(3, 4)$.

- Find the coordinates of M .
- M is also the midpoint of the line segment CD , where $C(1, 3)$. Find the coordinates of D .

a. $M(2, \frac{1}{2})$ b. $D(3, -2)$