Guide to:
Midpoint of a line segment

maths Links

Explanation:

The midpoint **M** of a line segment joining (x_1, y_1) and (x_2, y_2) is halfway between the two points. Find it by working out the mean (average) of the x-coordinates and the mean of the y-coordinates: $\mathbf{M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)}$.

If you are given one endpoint and the midpoint and asked to find the **other endpoint**, find the step from the known endpoint to the midpoint and add that same step again.

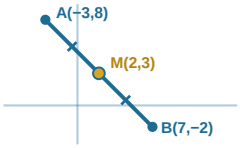
Example 1: Find the coordinates of the midpoint of the line segment joining **A(−3, 8)** and **B(7, −2)**.

Solution:

$x_M = \frac{-3 + 7}{2} = \frac{4}{2} = \mathbf{2}$

$y_M = \frac{8 + (-2)}{2} = \frac{6}{2} = \mathbf{3}$

Answer: (2, 3)



Example 2: M(4, −1) is the midpoint of line **PQ**. Given that **P** is **(1, 5)**, find the coordinates of **Q**.

Solution:

x-step from P to M: 1 → 4 is **+3**, so $x_Q = 4 + 3 = \mathbf{7}$

y-step from P to M: 5 → −1 is **−6**, so $y_Q = -1 - 6 = \mathbf{-7}$

Answer: Q(7, −7)

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