MIDPOINT OF A LINE SEGMENT

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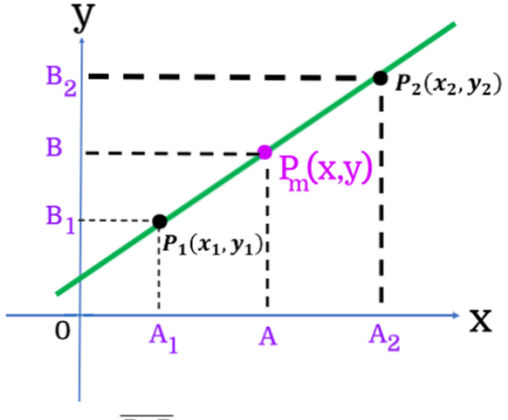
Given the endpoints $P_2(x_2, y_2) \wedge P_1(x_1, y_1)$. Hence, the midpoint is P(x,y):



Si: $r = \frac{\overline{P_1P}}{\overline{PP_2}} = 1 = r = \overline{P_1P} : \overline{PP_2}$

Using the formulas to obtain the coordinate of the point that divides a line given a ratio:

$$x = \frac{x_1 + rx_2}{1 + r} \qquad r \neq -1$$

$$y = \frac{y_1 + ry_2}{1 + r} \qquad r \neq -1$$

Substituting r=1:

$$x = \frac{x_1 + (1)x_2}{1 + (1)}$$

$$x = \frac{x_1 + x_2}{2}$$

$$y = \frac{y_1 + (1)y_2}{1 + (1)}$$

$$y = \frac{y_1 + y_2}{2}$$

} $P_m(x,y)$

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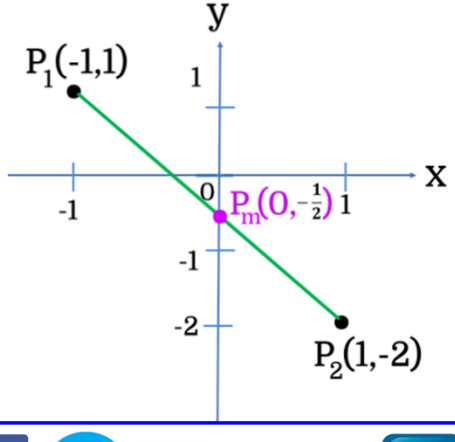
EXAMPLE: Find is the coordinate of the midpoint of the segment defined by the endpoints $P_1(-1,1)$ and $P_2(1,-2)$.

SOLUTION:



Finding the abscissa and ordinate of the midpoint:

$$x = \frac{x_1 + x_2}{2}$$

$$x = \frac{-1 + (1)}{2}$$

$$x = \frac{0}{2}$$

$$x = 0$$

$$y = \frac{y_1 + y_2}{2}$$

$$y = \frac{1 + (-2)}{2}$$

$$y = \frac{1 - 2}{2}$$

$$y = \frac{-1}{2}$$

$P(x,y) = P(0,-\frac{1}{2})$ ✓

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