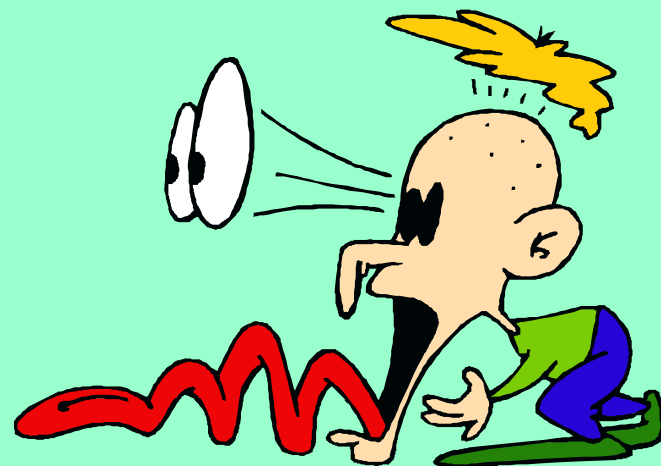


2. The Midpoint of a Line



The Midpoint of a Line

We have two points on the coordinate grid, A and B.

This time we want to find the middle of the line, known as the **midpoint**.

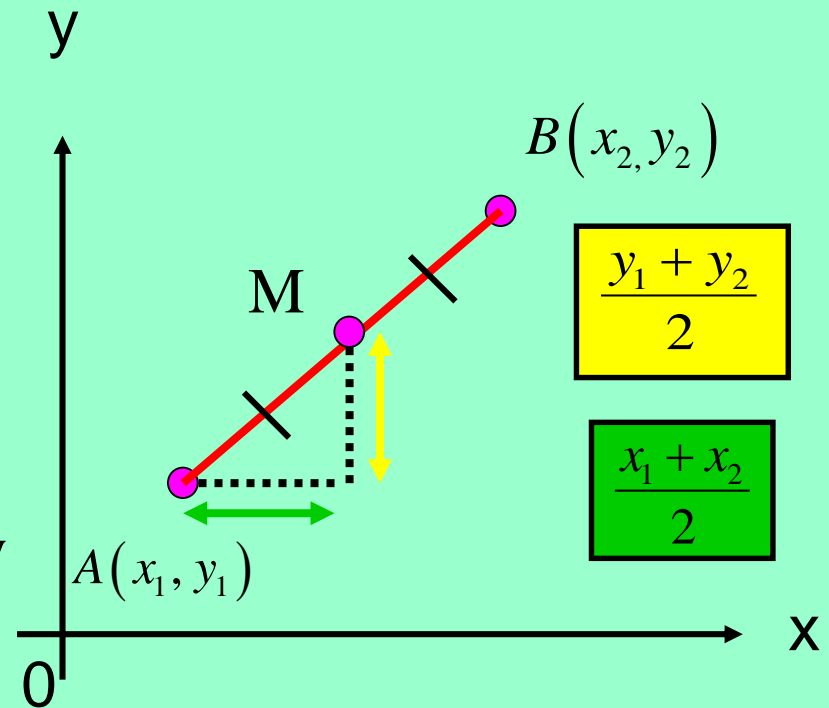
If say y_1 is 6 and y_2 is 10 then halfway between them would be 8.

$$ie \frac{6+10}{2} = 8$$

Similarly, if x_1 is 4 and x_2 is 8 then halfway between them would be 6.

$$ie \frac{4+8}{2} = 6$$

Copy the following



The Midpoint of a Line

The point exactly halfway between two points is given by:

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

Example 1

Find the coordinates of the midpoint of the line joining (4, -1) and (10, 7).

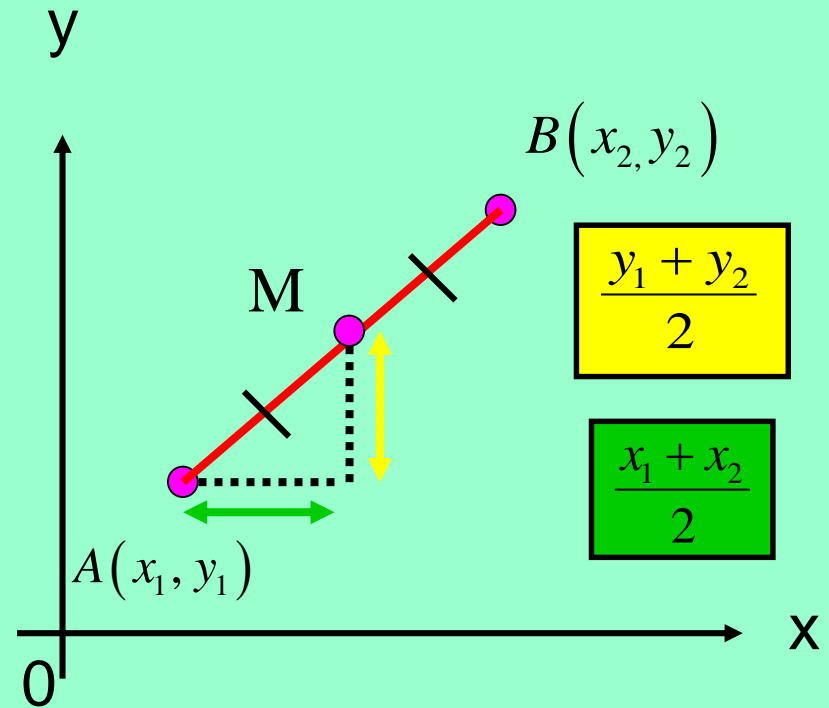
$$(x_1, y_1)$$

$$(x_2, y_2)$$

Solution:

$$M \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \longrightarrow M \left(\frac{4+10}{2}, \frac{-1+7}{2} \right)$$

$$M(7, 3)$$



Example 2

A rhombus has vertices $(-1, 4)$, $(4, 8)$, $(9, 4)$ and $(4, 0)$.
Find the point of intersection of the diagonals.

Solution:

Diagonals **bisect** each other, i.e. cut each other in half.

Point of intersection is midpoint of either diagonal

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) \longrightarrow M\left(\frac{4 + 4}{2}, \frac{8 + 0}{2}\right)$$
$$\Rightarrow M(4, 4)$$

