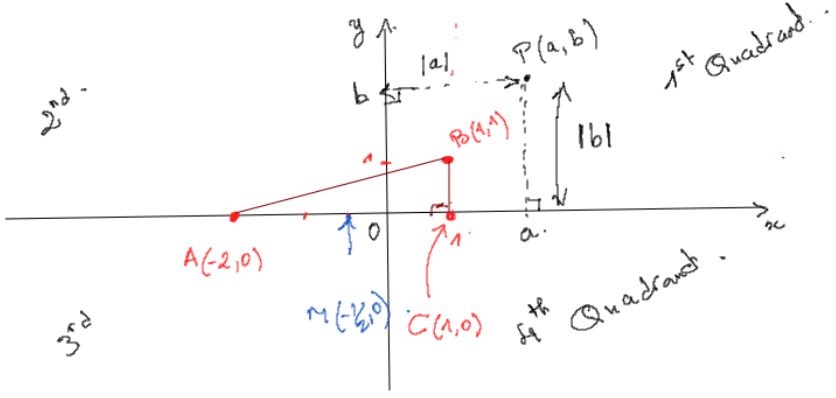
Coordinates and distance



Ex. Locate $A(-2,0)$, $B(1,1)$, $C(1,0)$.

Ex Find the middle of $[AC]$.

$$M\left(\frac{x_A+x_C}{2}, \frac{y_A+y_C}{2}\right) = \left(\frac{-2+1}{2}, \frac{0+0}{2}\right) = \left(-\frac{1}{2}, 0\right).$$

Ex distance AB.

$$AB = \sqrt{(x_B-x_A)^2 + (y_B-y_A)^2}$$

$$= \sqrt{(1-(-2))^2 + (1-0)^2} = \sqrt{3^2+1^2} = \sqrt{10}.$$

Ex. Show that the triangle ABC is a right triangle.

Check the Pythagorean theorem.

$$AB^2 \overset{?}{=} AC^2 + CB^2$$

$$\left(\sqrt{10}\right)^2 \overset{?}{=} \left(\sqrt{(1-(-2))^2+(0-0)^2}\right)^2 + \left(\sqrt{(1-1)^2+(1-0)^2}\right)^2$$

$$= \left(\sqrt{3^2}\right)^2 + \left(\sqrt{1^2}\right)^2$$

$$= 3^2 + 1^2 = 10.$$

yes. ABC is a right triangle at the vertex C.