

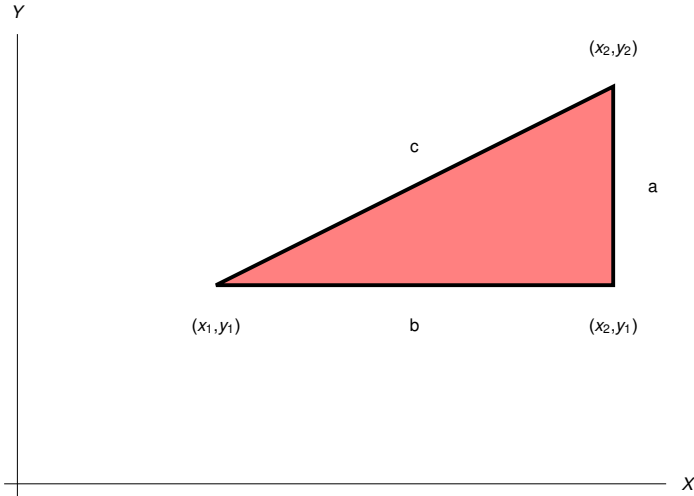
# Distance Function

This is obtained using the Pythagorean Theorem:

$$a^2+b^2=c^2$$

Where a and b are the length of the two legs of a right triangle and c is the length of the Hypotenuse. Consider a right triangle in the first quadrant of the Cartesian Plane:

Let  $P_1 = (x_1, y_1), P_2 = (x_2, y_1), P_3 = (x_2, y_2)$



What is the length of the side a?  $y_2 - y_1$   
 What is the length of the side b?  $x_2 - x_1$

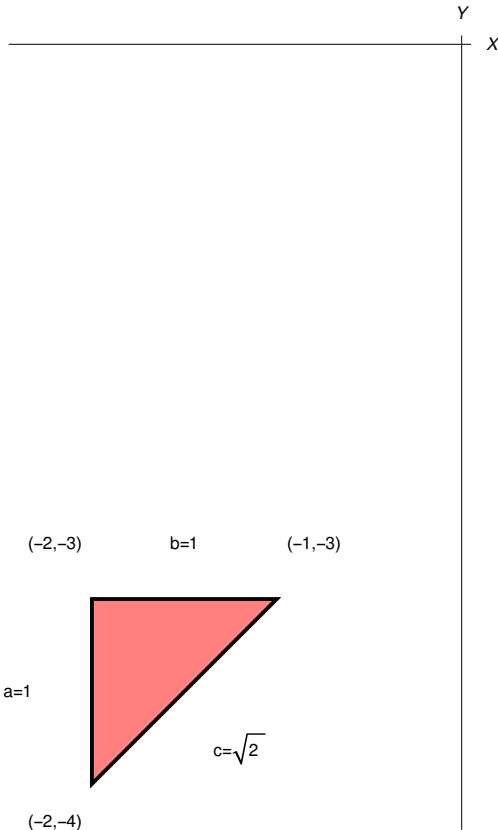
Then

$$c^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

and

Column  $\left[ c = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \right]$

## Example 1



$$a^2 = (-4 - (-3))^2 \Rightarrow a = 1$$

$$b^2 = (-2 - (-1))^2 \Rightarrow b = 1$$

$$c^2 = (-2 - (-1))^2 + (-4 - (-3))^2 \Rightarrow c = \sqrt{(-2 - (-1))^2 + (-4 - (-3))^2} = \sqrt{2}$$