

## The Distance Formula



## Preliminaries and Objectives

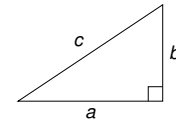
Preliminaries

- Pythagorean Theorem

Objectives

- Find the distance between two points in the Cartesian plane

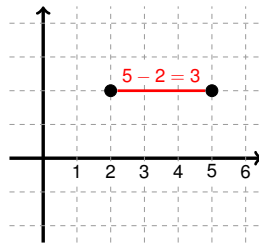
## Pythagorean Theorem



Pythagorean Theorem

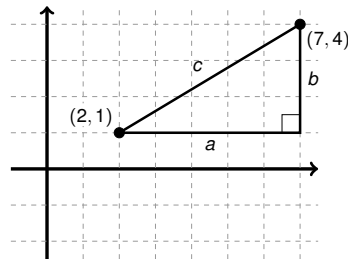
$$a^2 + b^2 = c^2$$

## Distance in one dimension



$$x\text{-distance} = 5 - 2 = 3$$

## Distance in two dimensions



$$a = 7 - 2 = 5$$

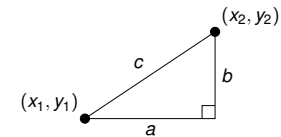
$$b = 4 - 1 = 3$$

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

$$5^2 + 3^2 = c^2$$

$$\sqrt{34} = c$$

## Distance Formula



$$a = x_2 - x_1$$

$$b = y_2 - y_1$$

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

$$c = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

## Recap

Find the distance between  $(x_1, y_1)$  and  $(x_2, y_2)$ .

Distance Formula

$$c = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$