The Distance Formula

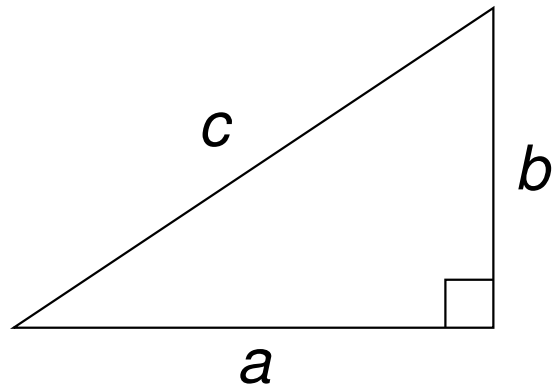UNIVERSITY OF MINNESOTA

Preliminaries and Objectives

Preliminaries

- Pythagorean Theorem

Objectives

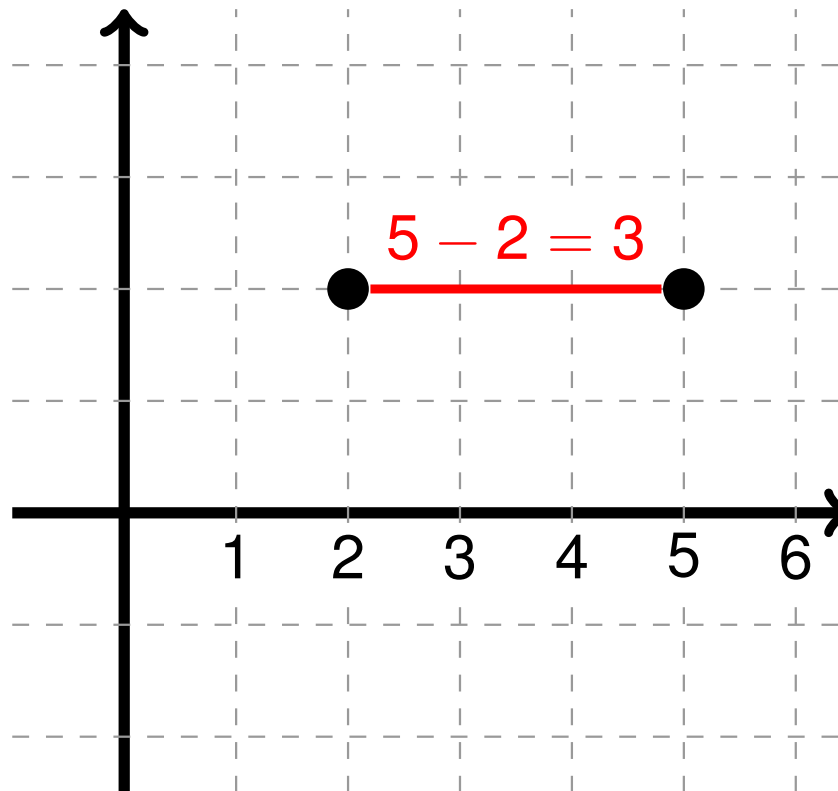- Find the distance between two points in the Cartesian plane

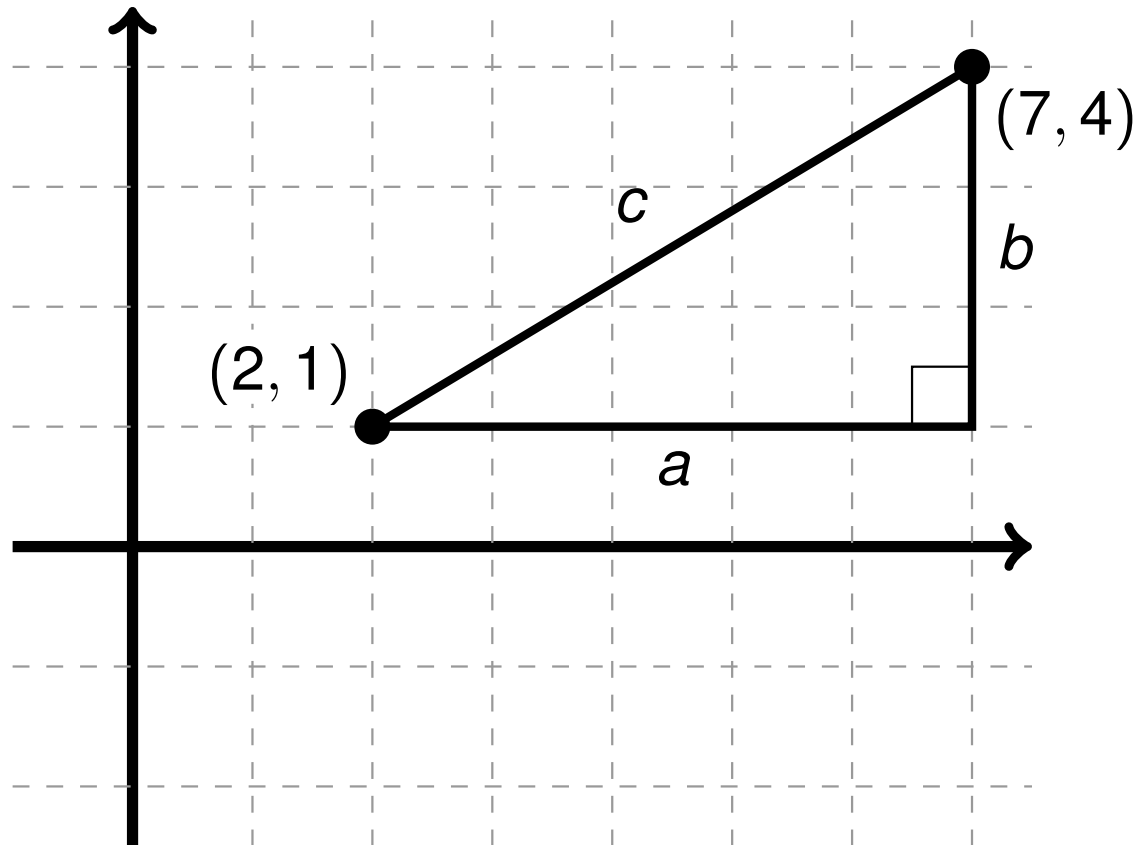# Pythagorean Theorem

> ## Pythagorean Theorem
>
> $$a^2 + b^2 = c^2$$

Distance in one dimension

$x\text{-distance} = 5 - 2 = 3$
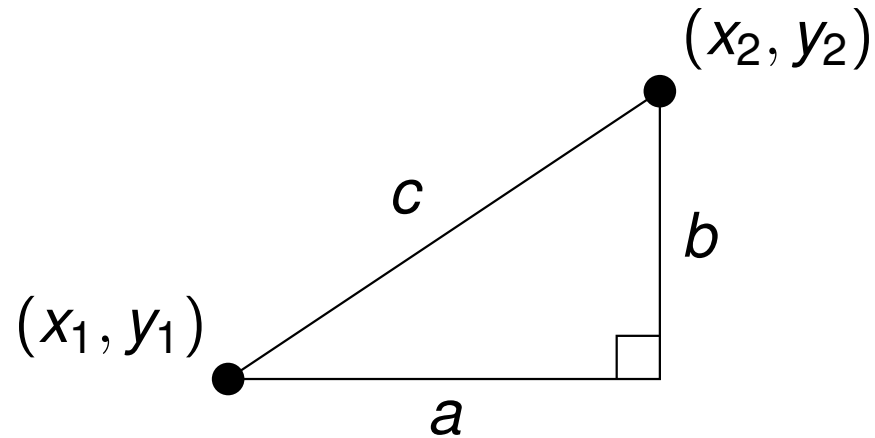
Distance in two dimensions

$a = 7 - 2 = 5$

$b = 4 - 1 = 3$

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

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

$\sqrt{34} = c$

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

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