

# Rates of Change



# Preliminaries and Objectives

## Preliminaries

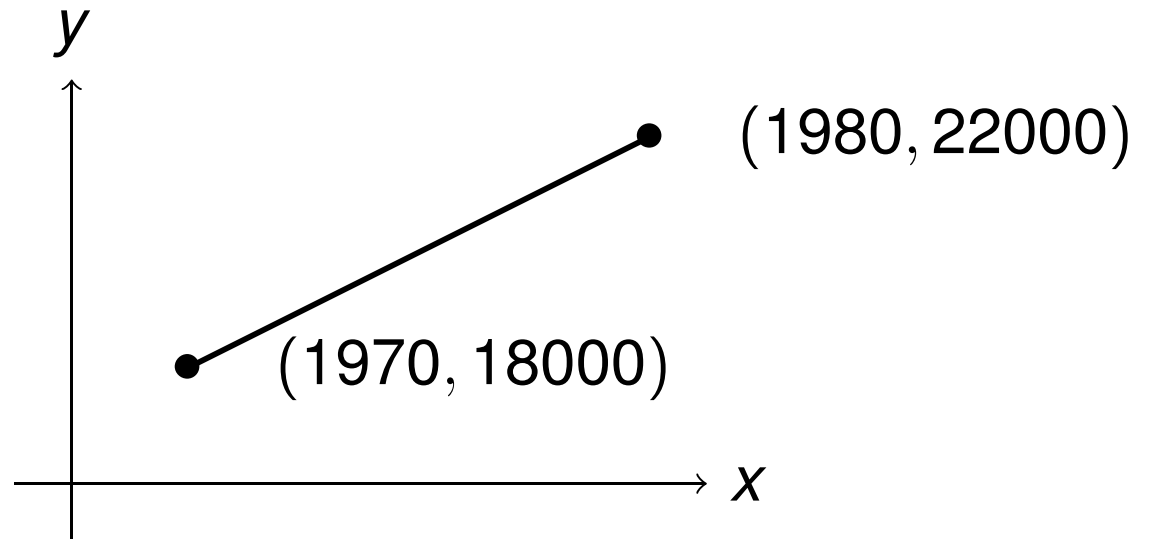
- Cartesian Coordinate System

## Objectives

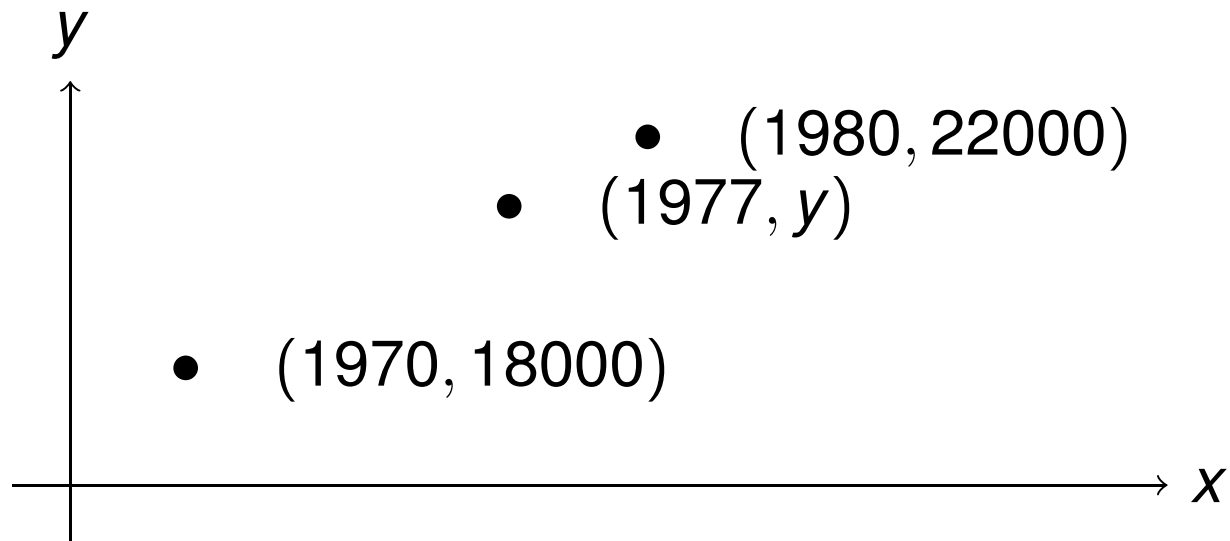
- Define **slope**
- Find additional points using slope

# Population Growth

Year	Population
1970	18,000
1980	22,000



# Finding Other Points



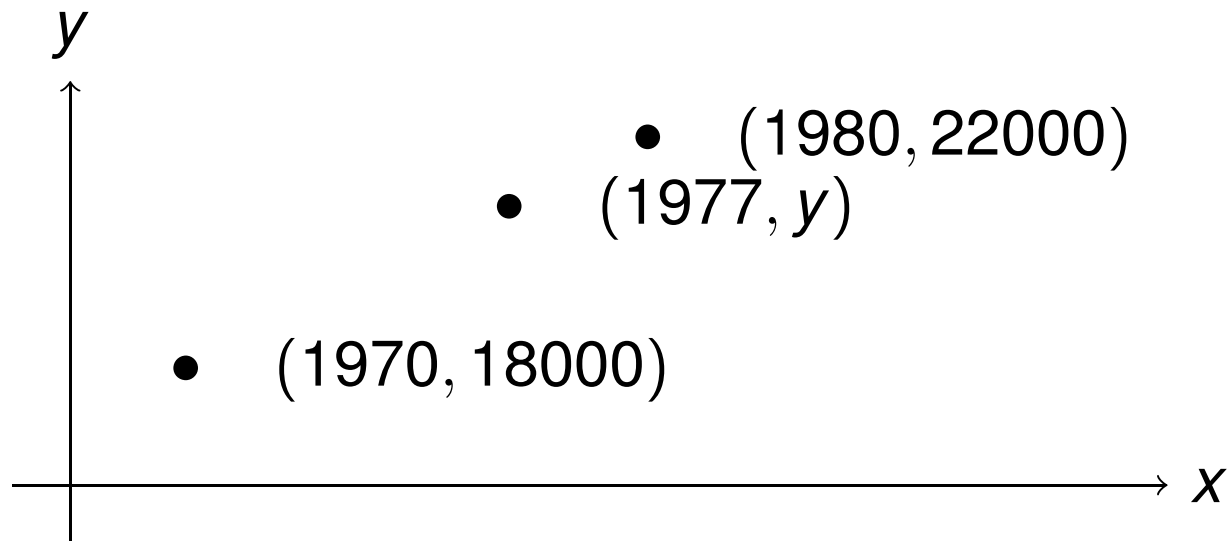
$$\text{slope} = 400 = \frac{y - 18000}{1977 - 1970} = \frac{y - 18000}{7}$$

$$\implies 7(400) = y - 18000$$

$$\implies 18000 + 7(400) = y$$

$$\implies y = 20800$$

# Finding Other Points



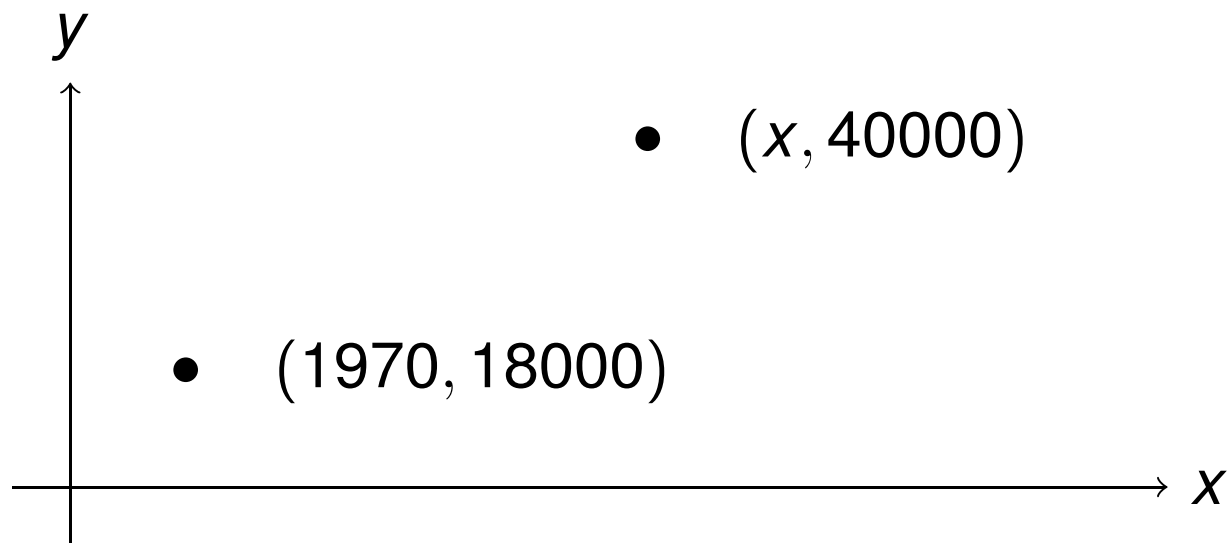
$$\text{slope} = 400 = \frac{y - 22000}{1977 - 1980} = \frac{y - 22000}{-3}$$

$$\implies (-3)(400) = y - 22000$$

$$\implies 22000 - 3(400) = y$$

$$\implies y = 20800$$

# Finding Other Points



$$\text{slope} = 400 = \frac{40000 - 18000}{x - 1970} = \frac{22000}{x - 1970}$$

$$\implies (400)(x - 1970) = 22000$$

$$\implies x - 1970 = \frac{22000}{400} = 55$$

$$\implies x = 2025$$

# Recap

$\Delta$  = change in

If two data points  $(x_1, y_1)$  and  $(x_2, y_2)$  are connected by a straight line, then the slope between the two points is given by the formula

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

# Credits

Written by: Mike Weimerskirch

Narration: Mike Weimerskirch

Graphic Design: Robert Hank



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