

Rates of Change



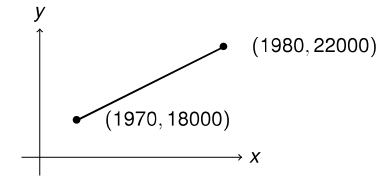
Preliminaries

- Cartesian Coordinate System

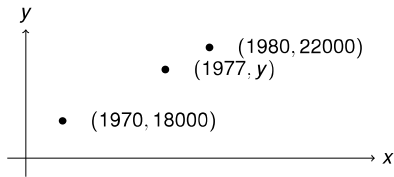
Objectives

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

Year	Population
1970	18,000
1980	22,000

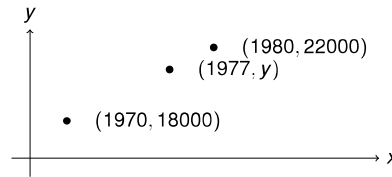


Finding Other Points



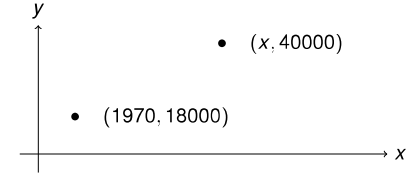
$$\begin{aligned} \text{slope} &= 400 = \frac{y - 18000}{1977 - 1970} = \frac{y - 18000}{7} \\ \implies 7(400) &= y - 18000 \\ \implies 18000 + 7(400) &= y \\ \implies y &= 20800 \end{aligned}$$

Finding Other Points



$$\begin{aligned} \text{slope} &= 400 = \frac{y - 22000}{1977 - 1980} = \frac{y - 22000}{-3} \\ \implies (-3)(4000) &= y - 22000 \\ \implies 22000 - 3(400) &= y \\ \implies y &= 20800 \end{aligned}$$

Finding Other Points



$$\begin{aligned} \text{slope} &= 400 = \frac{40000 - 18000}{x - 1970} = \frac{22000}{x - 1970} \\ \implies (400)(x - 1970) &= 22000 \\ \implies x - 1970 &= \frac{22000}{400} = 55 \\ \implies x &= 2025 \end{aligned}$$

Recap

Δ = 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

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