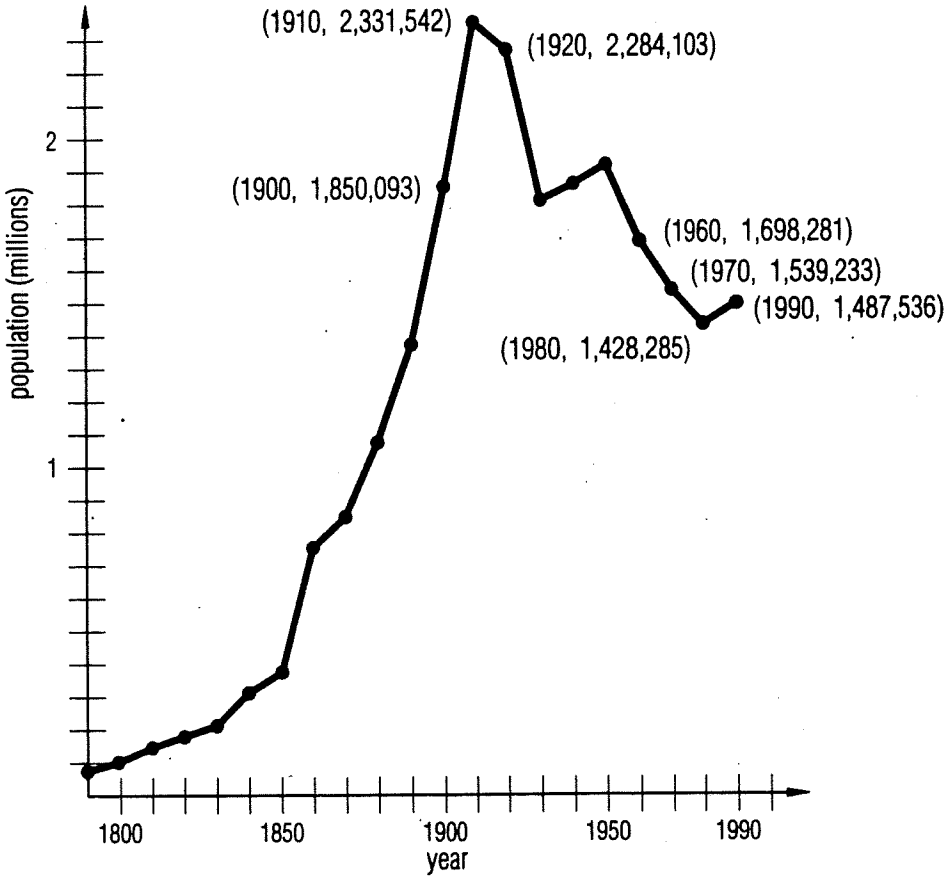
Algebra I
Notes 5.1 Defining Slope

Objectives: Calculate the slope of a line using a rise and a run or the ratio of the differences of the y- and x-coordinates.

Below is a graph of the population of Manhattan Island (part of New York) every ten years from 1790 to 1990. Coordinates of some of the points are shown.



The slopes of the lines connecting the points tell how fast the population went up or down. In this chapter, you will study many examples of lines and slopes.

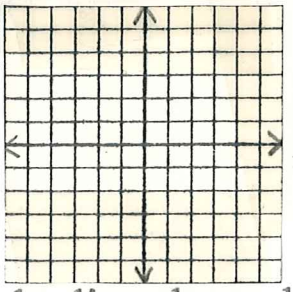
Situation	Rate of Change	Graph (from left to right)
increase	positive	upward slant
no change	zero	horizontal
decrease	negative	downward slant

If the rate of change in population is positive, does the population increase or decrease?

Another way of thinking of rate of change is in terms of coordinates. In the above example, the year is the x-coordinate and the population size is the y-coordinate. The **rate of change** between two points is calculated by dividing the difference in the y-coordinates by the difference in the x-coordinates.

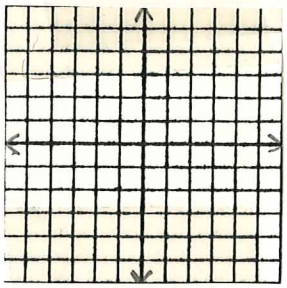
The rate of change between points (x_1, y_1) and (x_2, y_2) is

$$\frac{y_2 - y_1}{x_2 - x_1}.$$



Graph the line through the points (-3, 1) and (2,-4).

slope: _____ = _____ =



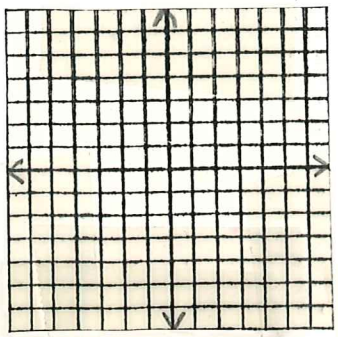
Graph the line through the points (4, 2) and (3, -3).

slope: _____ = _____ = ____ =

$$\text{SLOPE} = \frac{\text{rise}}{\text{run}} \quad \frac{\text{change}}{\text{change}}$$

Graph the lines with the given point and slope.

point (-2, 1); slope = ¼



point (3, -5); slope = -⅓