

### Example 3 - Calculate the slope of a line

Calculate the slope of the line passing through the points (2,2) and (6,4):

**Step 1** in the problem solving sequence states:

“Understand the problem statement”

The purpose of the algorithm is to take the two given data points and calculate the slope of the line.

**Step 2** in the problem solving sequence states:

“Develop an algorithm to solve the problem”

Remember the slope of a line ( $m$ ) passing through two points  $(x_1, y_1)$  and  $(x_2, y_2)$  is defined as:

$$m = (y_2 - y_1) / (x_2 - x_1)$$

The **inputs** to the system are the numbers:

$x_1$ :	2
$x_2$ :	6
$y_1$ :	2
$y_2$ :	4

The **output** of the system is the calculated slope of the line.

$$\text{slope} = (4 - 2) / (6 - 2)$$

Solution steps:

1. change in  $y = y_2 - y_1$
2. change in  $x = x_2 - x_1$
3. slope = change in  $y$  / change in  $x$

Following the above steps will produce the slope of the line for the given data points.

**Recap:**

Looking back to the description of an algorithm:

The inputs to the algorithm are the actual data points  $x_1, x_2, y_1, y_2$  found in the problem description. The output of the algorithm is the calculated slope of the line. The steps necessary to solve this algorithm are stated precisely (steps 1 through 3). Each step in the algorithm produces a unique value. The algorithm works for the given set of numbers. The algorithm is also general in nature, meaning that the steps will work for any set of numbers.

**Expanding the Concepts:**

What change(s) would have to be made to the algorithm to solve the slope of the line given the equation:  $y = mx + b$ , assuming  $y, x$  &  $b$  are given?