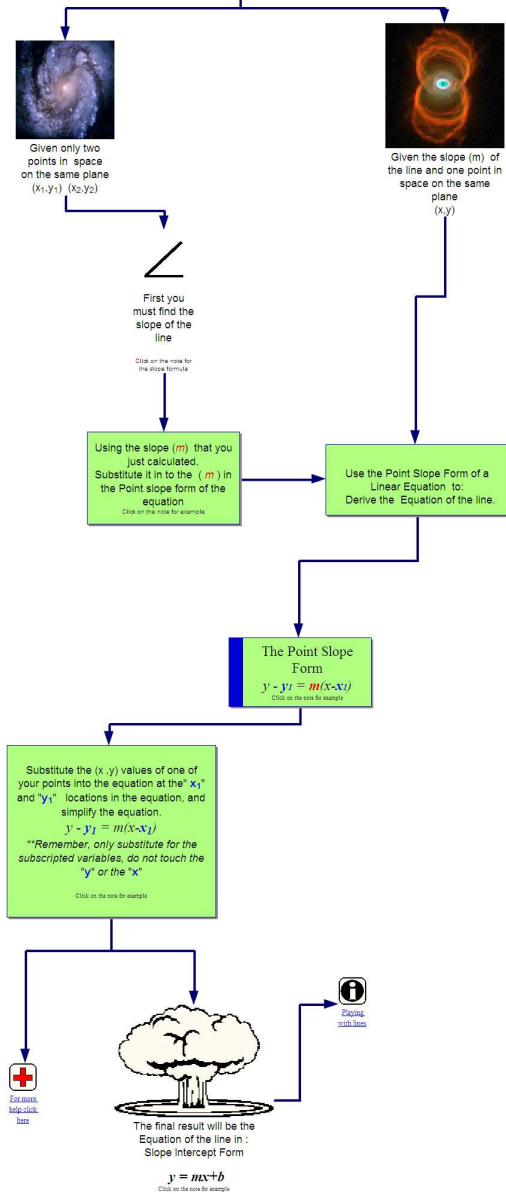


Determining the Equation of a line using Point Slope Form of a Linear Equation



## Determining the Equation of a line using Point Slope Form of a Linear Equation

### I. Given only two points in space on the same plane

$(x_1, y_1) (x_2, y_2)$

Example:

Points  $(2,3)$  and  $(4,1)$

#### A. First you must find the slope of the line

Click on the note for the slope formula

The slope formula is:

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

Example using (2,3) and (4,1)

$$m = 1-3 / 4-2 , m = -2/2$$

Thus the slope  $m = -1$

1. Using the slope ( $m$ ) that you just calculated.

Substitute it in to the ( $m$ ) in the Point slope form of the equation

Click on the note for example

$$y - y_1 = m(x - x_1)$$

We calculated the slope to be "-1", so we substitute it for "m" in the formula.

$$y - y_1 = -1(x - x_1)$$

a.

**Use the Point Slope Form of a Linear Equation**

**to:**

**Derive the Equation of the line.**

(1) **The Point Slope Form**

$$y - y_1 = m(x - x_1)$$

Click on the note for example

Example:

using slope,  $m = -2$

and point  $(4,1)$

$$y - y_1 = m(x - x_1)$$

$$y - 1 = -2x + 4$$

- (a) **Substitute the (x ,y) values of one of your points into the equation at the "  $x_1$  " and "  $y_1$  " locations in the equation, and simplify the equation.**

$$y - y_1 = m(x - x_1)$$

***\*\*Remember, only substitute for the subscripted variables, do not touch the "y" or the "x"***

Click on the note for example

Using the point  $(4,1)$  and our slope "m= -2"

$$y - 1 = -2x + 4$$

Simplifying:

$$y = -2x + 5$$

- i) **The final result will be the**

**Equation of the line in :  
Slope Intercept Form**

$$y = mx + b$$

Click on the note for example

**The Point Slope Form**

$$y - y_1 = m(x - x_1)$$

Given two points

(2,3) and (4,1)

First find the slope

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

$$m = 1 - 3 / 4 - 2 , m = -2/1$$

Thus the slope  $m = -2$

Substitute the (x ,y) values into  
the formula:

$$y - y_1 = m(x - x_1)$$

$$y - 1 = -2x + 4$$

Simplifying, we will have the equation of the line in Slope Intercept form as our answer:

$$y = -2x + 5$$

$$y = mx + b$$

(1) [Playing with lines](#)

ii) [For more help click here](#)

II. Given the slope (m) of the line and one point in space on the same plane (x,y)