Tutorial Set 32- Equations of Straight Lines (Linear Equations) with Comments - Part 1

Linear Equations have already been introduced. The plots of linear equations are straight lines. We will eventually be showing how to make such plots. Some examples of linear equations have been already given. Additional examples will now be given with some implications that that the equations could be plotted (or graphs made).

The basis form for of the equation for straight lines is
$y = mx + b$

We have seen that the distance-time- speed equation given as $d = st$ is linear and will give a straight line (where d is the distance traveled, s is the speed and t is the time). This equation assumes that the distance traveled is zero when the time is zero. However, we can make the equation more general by writing $d = st + do$ where "do" is the initial location at $t = 0$. We this change, we have a linear equation in the basic form.

To use the basic equation, we will let y = distance, m = speed, x = time and b = the initial location.

Example 1

Then write the equation for the distance for the speed = 50 and d = 20.
Solution: $y = 50x + 20$.
Using this equation, we can find the distance at any time x. We can make a table showing y versus x and later. We will also show how to write the equation of the line given a table of data of y versus x.
A table of y versus x going from 0 to 8 in steps of 2 is as follows:

x	y
0	20
2	120
4	220
6	320
8	420

Example 2

Which of the following will be an equation for this table? (Note: You can simple check to see which values will give a solution. We will later introduce techniques for writing equations of straight lines.) The equation is to be in the form $y = mx + b$.

a. $y = 2x + 12$
b. $y = 9x + 12$
c. $y = 3x + 8$
d. $y = 8x + 3$

x	y
0	8
1	11
2	14
3	17
4	20

Answer: Equation c. We see that y is equal to three times x plus 8.

Work the following problems:

1. What is the value of y at x = 6, given y = 4x + 4?
2. What is the value of y at x = -5 given y = 5x +6?
3. What is the value of y at x = -4 given y = -4x – 8?
4. What value of x will give y = 20 for y = 3x + 8?

Tutorial Set 33 - Equations of Straight Lines (Linear Equations) with Comments - Part 2

Work the following problems:

1. For the form of the equation y = mx + b, what is the value for m in the equation y = 6?
2. For the form of the equation y = mx + b, what is the value of m in the equation y = 4(x + 8)?
3. For the form of the equation y = mx +b, what is the value of x when y = 0 in the equation y = 8x - 2?
4. Which of the following will be an equation for this table? (Note: You can simple check to see which values will give a solution. We will later introduce techniques for writing equations of straight lines.) The equation is to be in the form y = mx + b.

   a. y = 4x + 14
   b. y = 6x + 14
   c. y = 2x + 8
   d. y = 2x + 6

x	y
0	6
1	8
2	10
3	12
4	14

Tutorial Set 34 - Equations of Straight Lines (Linear Equations) with Comments - Part 3

Work the following problems:

0 Given $y - 2 = 4(x + 8)$, write the equation in the form $y = mx + b$.
1 Given $y + 3 = 6(x - 2)$, write the equation in the form $y = mx + b$.
2 Given $y = (3/4)(x + 8)$, what is the value of y when $x = 0$?.
3 Given $2(y - 2) = 4(x + 6)$, write the equation in the form $y = mx + b$.

Tutorial Set 35 - Equations of Straight Lines (Linear Equations) with Comments - Part 4

We will later write the equation of a straight line based on the x and y intercepts. The following problems will prepare you to do this.

Work the following problems:

1 Given $2y - 6x = 12$, give the value of y when x is 0 and give the value x when y is 0.
2 Given $5y + 10x = 20$, give the value of y when x is 0 and give the value x when y is 0.
3 Given $2y - 6x = 12$, give the value of y when x is 0 and give the value x when y is 0.
4 Given $-3y - 9x = 18$, give the value of y when x is 0 and give the value x when y is 0.

Tutorial Set 36 - Equations of Straight Lines (Linear Equations) with Comments - Part 5

One method of write the equation of a line is based upon the slope of the line.
In the form of the question $y = mx + b$, m is the slope.

Find the slope for each of the following problems:

1 Given $2y - 6x = 12$
2 Given $5y + 10x = 20$
3 Given $2y - 6x = 12$
4 Given $-3y - 9x = 18$