Slope and Intercept of Linear Equations

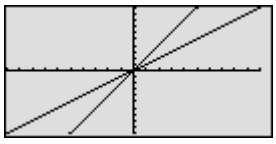
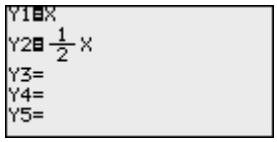
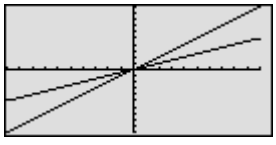
A linear equation of y in terms of x can be expressed by the slope-intercept form $y = mx+b$, where m is the slope and b is the y- intercept. We call this equation a linear equation since its graph is a straight line. Equations where the exponents on the x and y are 1 (implied) are considered linear equations. In graphing linear equations on the calculator, we will let the x variable be represented by the horizontal axis and let y be represented by the vertical axis.

Example

Draw graphs of two equations by changing the slope or the y- intercept.

1. Graph the equations $y = x$ and $y = 2x$.
2. Graph the equations $y = x$ and $y = \frac{1}{2}x$.
3. Graph the equations $y = x$ and $y = -x$.
4. Graph the equations $y = x$ and $y = x + 2$.

Before Starting There may be differences in the results of calculations and graph plotting depending on the setting. Return all settings to the default value and delete all data.

Step & Key Operation	***Display***	***Notes***
1-1 Enter the equation $y = x$ for Y1 and $y = 2x$ for Y2. [Y=] [X/θ/T/n] [ENTER] [2] [X/θ/T/n]		
1-2 View both graphs. [GRAPH]		The equation Y1 = x is displayed first, followed by the equation Y2 = 2x. Notice how Y2 becomes steeper or climbs faster. Increase the size of the slope (m>1) to make the line steeper.
2-1 Enter the equation $y = \frac{1}{2}x$ for Y2. [Y=] [▼] [CL] [1] [a/b] [2] [▶] [X/θ/T/n]		
2-2 View both graphs. [GRAPH]		Notice how Y2 becomes less steep or climbs slower. Decrease the size of the slope (0<m<1) to make the line less steep.

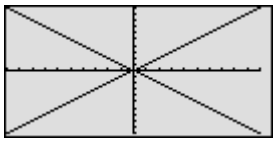
Step & Key Operation	***Display***	***Notes***

3-1 Enter the equation $y = -x$ for Y2.

[Y=] [▼] [CL] [(-)] [X/θ/T/n]

3-2 View both graphs.

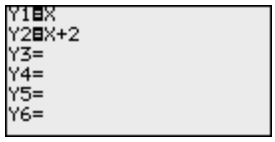
[GRAPH]



Notice how Y2 decreases (going down from left to right) instead of increasing (going up from left to right). Negative slopes ($m<0$) make the line decrease or go down from left to right.

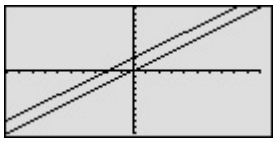
4-1 Enter the equation $y = x + 2$ for Y2.

[Y=] [▼] [CL] [X/θ/T/n] [+] [2]



4-2 View both graphs.

[GRAPH]



Adding 2 will shift the $y = x$ graph upwards.

Making a graph is easy, and quick comparison of several graphs will help students understand the characteristics of linear equations.