Unit 6: Lesson 07

Comparing linear graphs with a graphing calculator
Evaluating linear functions with a calculator

In this lesson we will use the graphing calculator to simultaneously view the graphs of two lines. This will lead to an understanding of the effect of changing:

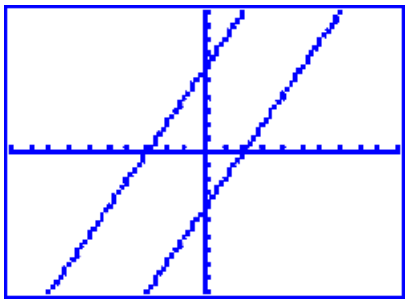
- the y-intercept
- the slope

See **Calculator Appendix E** and its associated video for how to graph and compare two lines with differing parameters.

Example 1: Use a graphing calculator to simultaneously graph these two linear functions:

$\mathbf{Y_1} = 2x - 4$ and $\mathbf{Y_2} = 2x + 6$

Make a sketch of the calculator display and comment on what is different and what is the same about these two lines.

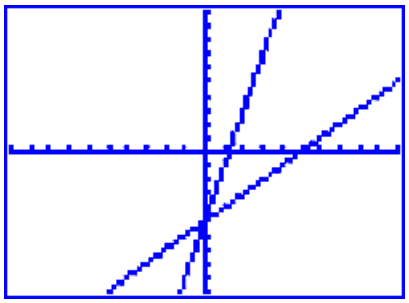


The two lines are parallel (because they have the same slope) but they cross the y-axis at different places because they have different y-intercept values.

Example 2: Use a graphing calculator to simultaneously graph these two linear functions:

$\mathbf{Y_1} = x - 5$ and $\mathbf{Y_2} = 4x - 5$

Make a sketch of the calculator display and comment on what is different and what is the same about these two lines.



The two lines have the same y-intercept; however, Y2 is steeper because its slope, 4, is larger than the other slope, 1.

The graphing calculator can also be used to evaluate functions for a particular *x* value.

See **Calculator Appendix F** and its associated video for how to evaluate a function at a particular *x* value.

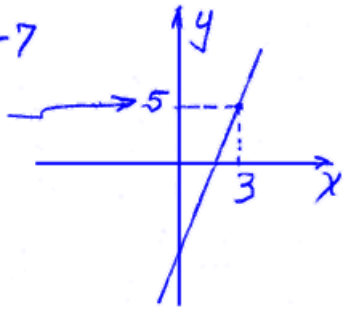
Example 3: Manually evaluate the function y = f(x) = 4x – 7 at x = 3. Make a sketch of the function labeling both x = 3 and f(3).

$f(x) = 4x - 7$

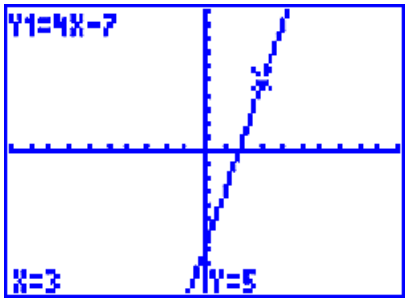
$f(3) = 4 \cdot 3 - 7$

$= 12 - 7$

$= \boxed{5}$



Example 4: Use a graphing calculator to graph **Y1** = 4x – 7. Use **2nd Calc | 1: Value** to evaluate this function at x = 3. Make a sketch of the calculator display including the answer it gives.



Assignment:

1. Use a graphing calculator to simultaneously graph these two linear functions:

Y_1 = 2x + 1 and **Y_2** = -2x +1

Make a sketch of the calculator display and comment on what is different and what is the same about these two lines.

2. Use a graphing calculator to simultaneously graph these two linear functions:

Y_1 = x – 1 and **Y_2** = x + 8

Make a sketch of the calculator display and comment on what is different and what is the same about these two lines.

3. Manually evaluate the function y = f(x) = -x + 5 at x = 2. Make a sketch of the function labeling both x = 2 and f(2).

4. Use a graphing calculator to graph **Y_1** = -x + 5. Use **2^{nd} Calc | 1: Value** to evaluate this function at x = 2. Make a sketch of the calculator display including the answer it gives.

5. Use a graphing calculator to simultaneously graph these two linear functions:

Y1 = -x + 4 and **Y2** = -2x + 4

Make a sketch of the calculator display and comment on what is different and what is the same about these two lines.

6. Use a graphing calculator to graph **Y1** = -6x – 2. Use **2nd Calc | 1: Value** to evaluate this function at x = -1. Make a sketch of the calculator display including the answer it gives.