5-10 Technology: Families of Lines

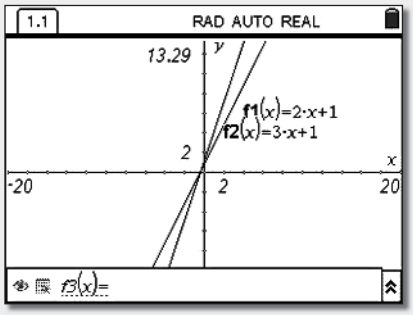
Name _____ Date _____

You can use a handheld to graph the equations $y = 2x + 1$, $y = 3x + 1$, $y = -2x + 1$, and $y = -0.2x + 1$. How does the value of m affect the graph of $y = mx + b$?

Step 1 Press ⌂. Then choose 2 to select **Graphs & Geometry**.

Step 2 Input $2x + 1$, then press enter to graph the line.

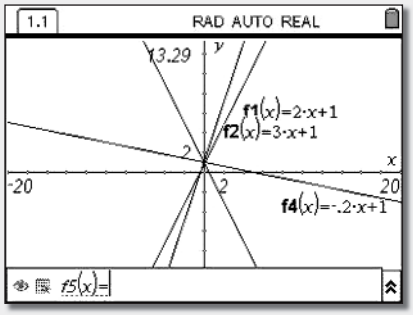
Step 3 Input $3x + 1$, then press enter to graph the line.



Step 4 Input $-2x + 1$, then press enter to graph the line.

Step 5 Input $-0.2x + 1$, then press enter to graph the line.

The value of m changes the slope of the graph. If m is positive, then the graph slants up. If m is negative, then the graph slants down. The greater the absolute value of m, the steeper the line.



Predict how the graphs of the functions will compare. Then use a handheld to verify your prediction.

1. $y = 5x$, $y = 5x + 3$, $y = 5x - 2$, $y = 5x + 2.8$, and $y = 5x - 1.9$

parallel, different *y*-intercepts

2. $y = 10x$, $y = 10x + 5$, $y = 10x - 7$, $y = 10x + 3.1$, and $y = 10x - 0.8$

3. $y = -x + 6$, $y = 3x + 6$, $y = -0.8x + 6$, $y = -3x + 6$, and $y = 2.3x + 6$

4. $y = -2x - 9$, $y = 2x - 9$, $y = -0.6x - 9$, $y = -4x - 9$, and $y = 1.8x - 9$

5. $y = -5x + 1$, $y = 3x - 1$, $y = -2x + 7$, $y = -3x - 8$, and $y = 0.4x + 12$

6. $y = -7x - 3$, $y = 4x + 2$, $y = -5x + 3$, $y = -8x + 11$, and $y = 0.9x + 15$

Predict how the graphs of the functions will compare. Then use a handheld to verify your prediction.

7. $y = 4x + 3.2$, $y = 1.2x + 3.2$, $y = -5.3x + 3.2$, $y = 0.9x + 3.2$, and $y = -0.1x + 3.2$

8. $y = -9x - 1.5$, $y = 3.4x - 1.5$, $y = -0.3x - 1.5$, $y = 2x - 1.5$, and $y = -0.7x - 1.5$

9. $x + y = -12$, $x + y = 8$, $x + y = -1$, $x + y = 4$, and $x + y = -6.8$

10. $x - y = -6$, $x - y = 2$, $x - y = -4$, $x - y = 11$, and $x - y = -9.5$

11. $2x - 3y = -6$, $3x + 2y = 4$, $4x - y = -2$, $x - 5y = -10$, and $7x - y = -2$

12. $3x + 5y = 15$, $3x + 3y = 9$, $7x - y = -3$, $3x + 7y = 21$, and $8x - y = -3$

13. $4x + 2y = 3$, $4x + 2y = 7$, $4x + 2y = -1$, $4x + 2y = 11$, and $8x + 4y = 28$

14. $3x + 5y = 1$, $3x + 5y = -2$, $3x + 5y = -10$, $6x + 10y = 29$, and $3x + 5y = -15$

Solve.

15. A graph with slope 2 and y-intercept -5 is shifted 3 units up and the slope is halved. This graph is then shifted 7 units down and the slope is doubled. What is the equation of each graph? How do the final and original graphs compare? Graph each equation on a handheld to check your answers.

16. May graphed $2x + y = -2$, $2x + y = -5$, $2x + y = 3$, $8x + 4y = -7$, and $2x + y = -10$. Mick graphed $x - 2y = 4$, $x - 2y = 10$, $x - 2y = -6$, $2x - 4y = 7$, and $x - 2y = 20$. How are May's and Mick's graphs similar? How are they different?

CRITICAL THINKING

17. In $y = mx + b$, where x is positive, how are the values of x and y affected as m increases? Make a table of values on a handheld to check your answer.