

3.2.22 Reflect and Apply

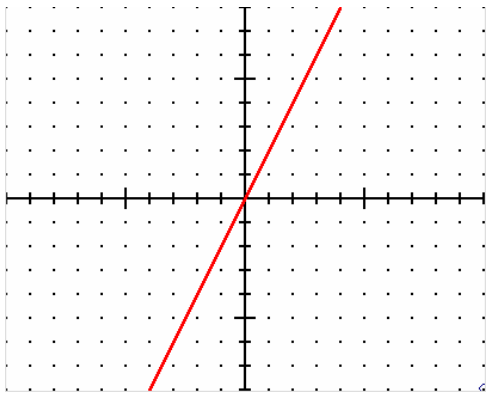
The Weight of Money

As you recall from the activity, the weight in the cup increased constantly every time more pennies were added to the cup starting with no weight in the cup. Therefore, the Rate of Change for this problem was the weight of each penny. However, in Part III you added two quarters to the cup. Although this did not change the rate of change it managed to change the relationship in the sense that the initial amount was now different from zero. This initial amount is represented in a linear equation by the y-intercept. Graphically, the slope of the line remained unchanged but the location of the y-intercept changed.

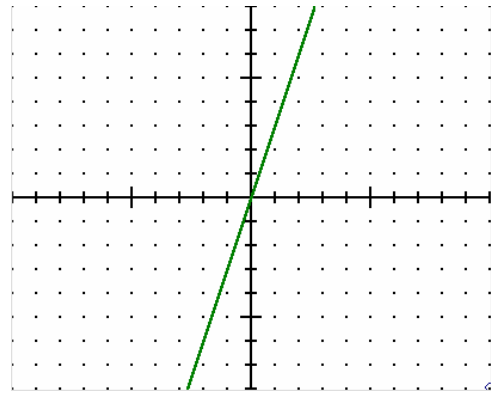
Algebra I Connections

Part I. Graph the new lines given an equation and a graph and briefly explain what happens to the graph based on the new equation:

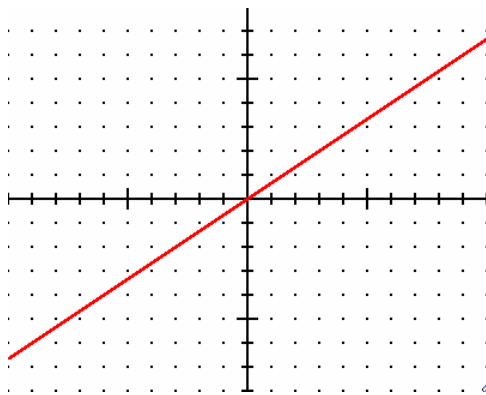
(a) Given the graph of the equation $y = 2x$, provide the graph of $y = 2x + 3$



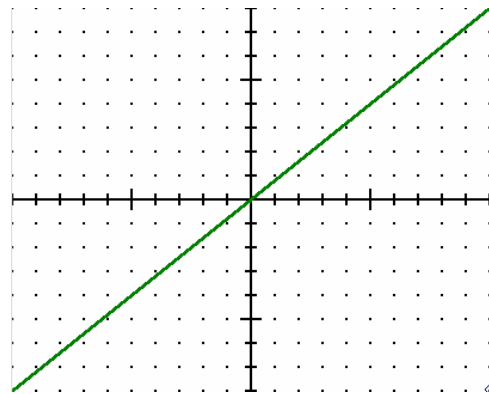
(b) Given the graph of the equation $y = 3x$, provide the graph of $y = 3x + 5$



(c) Given the graph of the equation $y = \frac{2}{3}x$, provide the graph of $y = \frac{2}{3}x + 4$

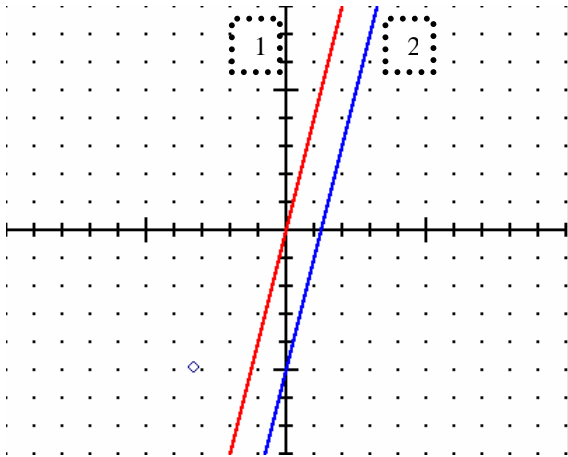


(d) Given the graph of the equation $y = \frac{4}{5}x$, provide the graph of $y = \frac{4}{5}x - 2$

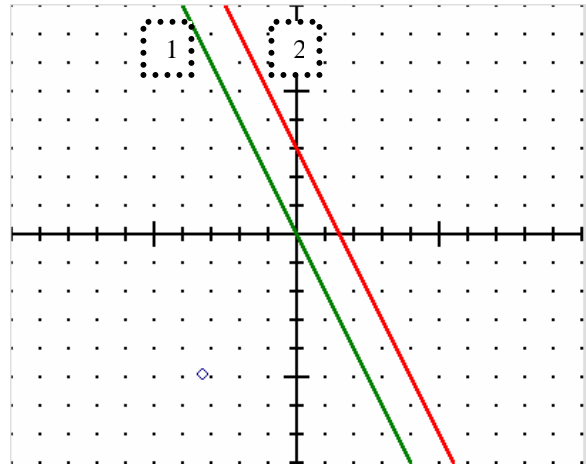


Part II. Given the equation of a line and its respective equation, provide the equation and its new graph of a line with the given changes:

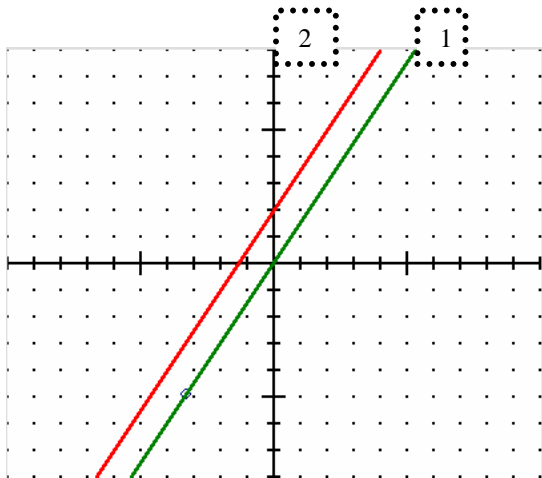
(a) Given the graph of $y = 4x$, give the equation of the second line



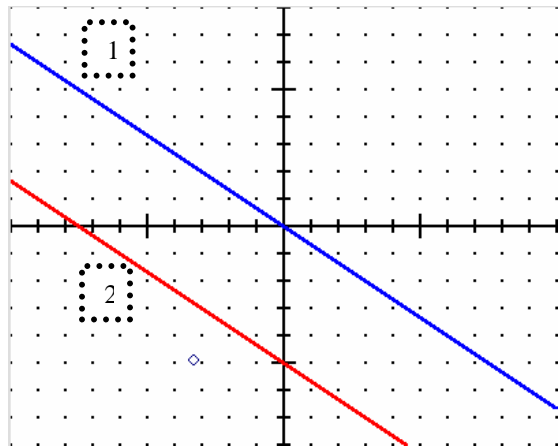
(b) Given the graph of $y = -2x$, give the equation of the second line.



(c) Given the graph of $y = \frac{3}{2}x$, give the equation of the second line

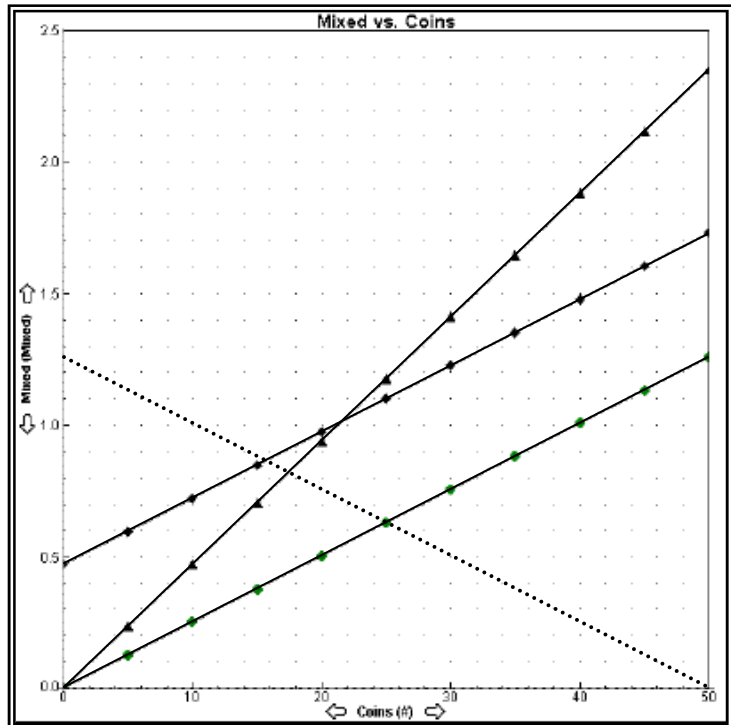


(d) Given the graph of $y = -\frac{2}{3}x$, give the equation of the second line.



Part III. Applying what you learned from "Weight of Money"

In order to double check his answers to question #17, Tony collected some data with some coins he had available before the end of the period. For the experiments he used pennies, and half-dollar coins. Unfortunately, when he printed the graph he forgot to include the data as well and the bell rang! When he went home to study for the quiz he compared the graphs of the data he collected but could not remember which graph represented what situation. All he could remember is that he collected data 3 times, some with pennies only, some with half-dollars only and the third one using pennies and half-dollar coins. So Tony came to YOU, his private tutor, and asked you to explain to him how to determine which graph represented each scenario.



Based on your experience of The Weight of Money and Linear Functions:

- Write a detailed explanation to Tony on how you can determine which graph represents what situation, and how you are reaching such conclusion. Be sure to explain how changing the type of coins affects the graphical representation, and indicate what happens to the graphs when the cup is empty or has an initial weight.
- Write an equation in functional notation that represents each of the three situations based on the graphical representation.
- Is there a logical explanation of a 4th data collection that would produce the "dotted" line? What would this imply about the relationship of the weight as the number of coins increases?