

1. Find the slope of the line passing through the points (4, 3) and (10, -2).
2. Given the following two equations, solve for x and y: $12 = 2x + 3y$ $4x = y$
3. Rewrite this equation in slope-intercept form and find its slope: $6x + 4y = 12$
4. Now find the slope of the line $5y + 10x = 15$. Is the slope of this line steeper or flatter than in the previous question?
5. Plot the equations from 3 and 4 on the same graph and find the point (values of x and y) where both equations are true.
6. 0 degrees Celsius = 32 degrees Fahrenheit, and 100 Celsius = 212 Fahrenheit.
 - a. Plot a line which shows the full relationship between Celsius and Fahrenheit.
 - b. Write the equation that does the same thing.
 - c. If the temperature rises by 1 degree Fahrenheit, how many degrees Celsius does it rise?
 - d. Is there any temperature at which C and F give the same number? If so, what is it?
 - e. Can you find the same point by plotting $C = F$ on the graph you already generated?
7. Lucy can buy Maracas for \$3 each and Popcorn for \$4 per bag. She has income of \$60 to spend only on these two goods. Below is her "budget constraint" for these purchases:

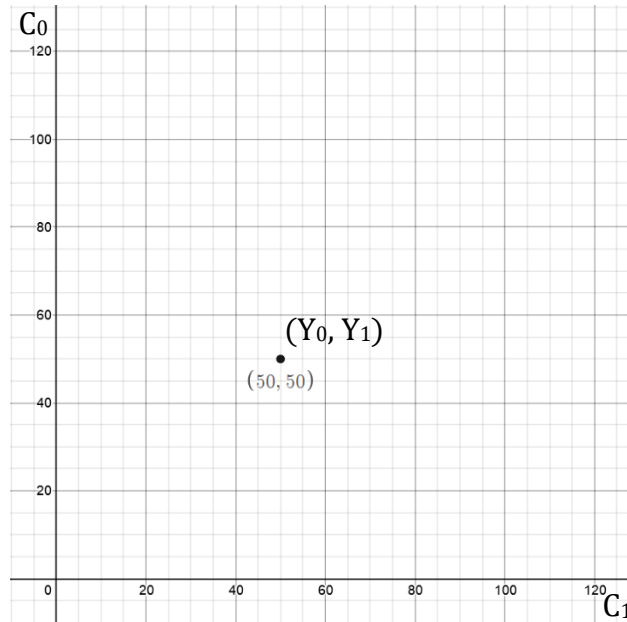


- a. Write the equation of this line and find the slope.
- b. Lucy is very picky and will only eat a bag of Popcorn if she has two Maracas to shake with it. Find the combination of 2 M per P that lies on her budget constraint.

8. Niles can buy Wrenches for \$5 each and Flowers for \$4 each. He has income of \$90. Like Lucy, he insists on a particular ratio of these two goods: for every 2 W, 5 F.
 - a. Write the equation of his budget constraint and find its slope.
 - b. Find the combination of 2 W per 5 F that lies on his budget constraint.
 - c. How would his budget constraint change if he had \$180 to spend? Draw both the original and new budget constraints, and find the new 2 W per 5 F combination.

9. Bob will make \$50 this year (Y_0) and \$50 next year (Y_1); he's deciding how much to spend this year and next year (C_0 is money spent this year, C_1 is money spent next year) and has the option of saving or borrowing money.

On the graph below notice the point (50, 50). This is the amount he can spend this year and next if he neither borrows nor saves. The x and y intercepts (once you draw in his budget constraint) show the maximum amount he can consume by saving or borrowing, respectively.



- Assuming Bob can save any or all of this year's \$50 of income (Y_0), show all the combinations of C_0 and C_1 Bob can afford. (Bob does not earn interest on his saving; he just keeps it in his wallet until next year.)
- Now assume Bob's parents will forward any or all of his income next year (Y_1) to spend this year. In other words, he can borrow against Y_1 (still at no interest). Show all of the combinations of C_0 and C_1 that he can afford.
- Now assume Bob's parents offer to pay 10% interest for any of his Y_0 that he saves, but they also charge him 10% interest for any borrowing that he does. Plot all the combinations that he can afford. (Draw this new budget constraint on the same graph you used in Part b.)
- How would this look different if the interest rate changed? Sketch how the budget constraint would change if r increased to 15% for both saving and borrowing.
- Test your intuition: If Bob intends to save some of his income, a high interest rate is good for him. If he intends to borrow, a high interest rate is bad for him. Do the graphs you drew above show this?

10. *Calculus is not required for intro courses, but it is for later Economics classes*

Given $f(x) = 3x^2 + 4x + 2$, find $f'(x)$.