Discussion 1

Important Topics

- Math Review

- Opportunity Costs and Comparative Advantage (if time)

Math

We'll use a lot of algebra and graphs in this course. It's important that the rote math steps are automatic so we can focus on the more interesting economic applications. So, you should be comfortable graphing equations, finding an equation from a graph, solving for two unknowns with two equations, and calculating percentages.

Graphing a line is usually most conveniently done if we first have the equation in *slope intercept* form.

Slope intercept form: $y = mx + b$

- m is the slope, rise over run.

- b is the y-intercept.

Sometimes you will instead encounter the same equation, but in the form $x = a + cy$. We have x in terms of y instead of in the usual slope intercept form. Here, it turns out a is the x-intercept and c is the inverse slope.
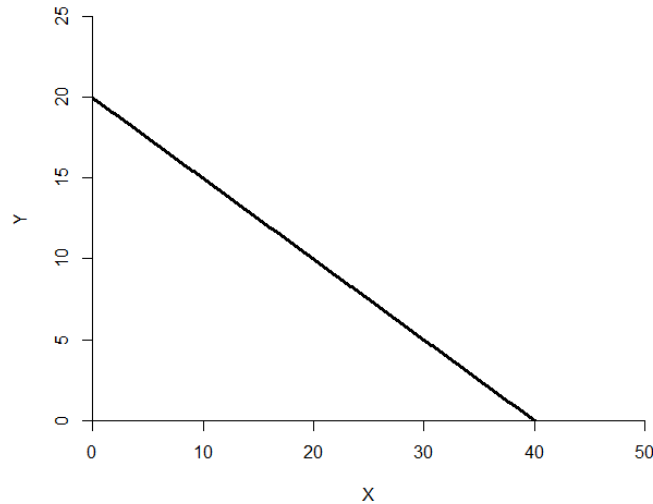
$$c = \frac{1}{m} \qquad a = \frac{-b}{m}$$

You can also ignore this relationship and just convert everything to slope intercept form and work from there.

Percentage change: If we have an original and new values, the percentage change is calculated as
$$\frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100.$$

Exercise 1 Find the equation for the graph below. What is the area below the curve (the triangle formed with the axes)?

Exercise 2 Graph $x = 10y$ and $y = 100 - x$.

Exercise 3 Solve for x and y given the equations

$$y = 2x + 4y + 2$$

$$x = 2y + 4.$$

Exercise 4 In 2013, Theranos, the health technology company, was valued at \$9 billion. More recently, the company's value has been revised to \$800 million. What is the percentage change in the company value?

Exercise 5 On June 14, 2000, the Indiana Pacers lost to the Los Angeles Lakers in game four of the NBA finals, giving the Lakers a 3-1 edge on the series. Shaquille O'Neal made 10 free throws on 17 attempts. Reggie Miller made 11 free throws on 12 attempts. How many more free throws would Shaq have to make in a row to match Reggie's percentage?

Economics

Exercise 6 A Robinson Crusoe Economy

Crusoe finds himself stranded on an island. He devotes 10 hours each day to either gathering coconuts or catching fish. Crusoe can gather 2 coconuts in an hour, but he

needs 5 hours to catch a single fish. On the other side of the island is Friday. Friday also devotes 10 hours each day to gathering coconuts and fishing. He can gather 3 coconuts per hour and needs only 2.5 hours to catch a fish.

a.) What is the opportunity cost of gathering a coconut for Crusoe? For Friday?

b.) What is the opportunity cost of catching a fish for Crusoe? For Friday?

c.) Draw Crusoe's production possibilities frontier with coconuts on the x-axis. Give its equation. On a separate graph, do the same for Friday.

One day, Crusoe and Friday befriend each other and they decide to work together.

d.) Who should specialize in coconuts? In fish? Justify your answer using the language of comparative advantage.

e.) Draw a new joint PPF (reflecting their combined production possibilities).