Econ 200 AE Spring '25 Week 2

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Section Information / Reminders

Friday 11:30am, MOR 221.

Office Hours: Tue Thur 11am-12pm, SAV 403.

Weekly material posted on onirudh3.github.io/teaching.

Grading:

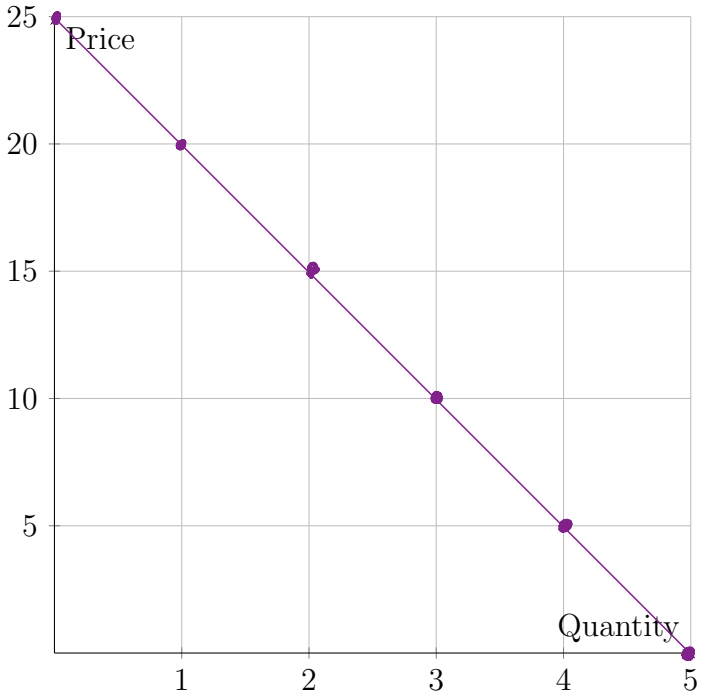
- Homework: 20% (lowest grade dropped), due every Thursday 11:59pm.
- Writing assignments: 20% (two 2 page assignments due May 1 and June 5).
- Midterm: 30% April 29.
- Final: 30% (non-cumulative) June 5.

Math Review

1. Graph the following with price on the y-axis and quantity on the x-axis. What is the slope of the curve?

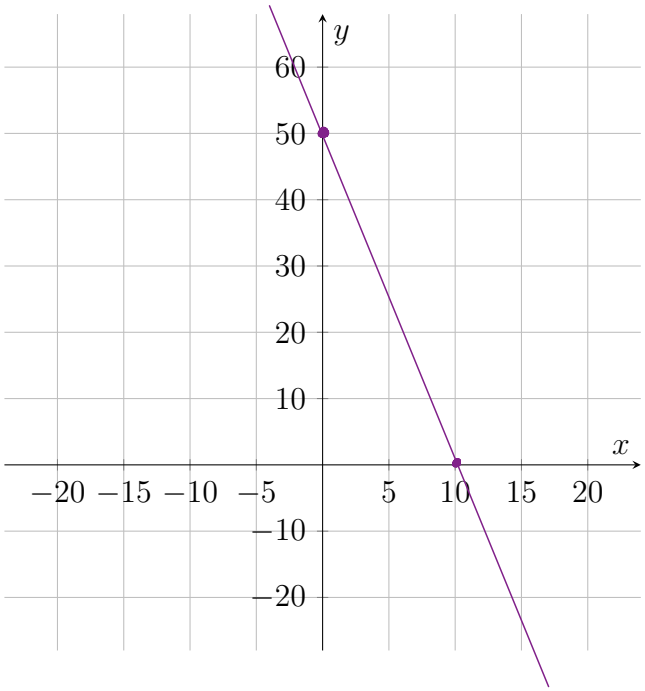
Price	Quantity
0	5
5	4
10	3
15	2
20	1
25	0

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{25-0}{0-5} = -5$$



2. Graph the following equation. What are the slope, x and y intercepts?

$$100 = 2y + 10x$$



$y=0 \Rightarrow x=10$

$x=0 \Rightarrow y=50$

$\text{slope} = \frac{50}{-10}$

$= -5$

3. Solve the following system of simultaneous equations for x and y.

$$x + y = 72$$
$$5x + y = 90$$

$-4x = -18$
$x = 4.5$
$\Rightarrow y = 67.5$

Unit 2 Review

Some important things to recall (not exhaustive):

- Economic cost of an action = direct costs incurred by taking the action + opportunity cost.
- Economic rent = net benefit from option taken − opportunity cost.
- Specialization and gains from trade.
- Production function: $Y = f(\text{inputs})$.
- Cost of production = $\sum$ price of input $\times$ quantity of input.
- Profit = revenue − cost.
- For two inputs, slope of isocost line gives relative prices of the two inputs. More generally,

$$ax + by = c \implies \text{Slope} = -\frac{a}{b}$$

Problems

4. [Marginal decisions]. Suppose the price of a sweater is \$26. Matteo's benefit from purchasing each additional sweater is given in the table. He gets the most benefit from the first sweater and less benefit from each additional sweater. If he is rational, how many sweaters will he purchase?

	Marginal Benefit		Marginal Cost
1st sweater	\$60	>	\$26
2nd sweater	\$45	>	\$26
3rd sweater	\$40	>	\$26
4th sweater	\$33	>	\$26
5th sweater	\$22	<	\$26
6th sweater	\$18		\$26

4 sweaters purchased.

5. [Economic decisions]. Suppose you have the choice of going to a theatre concert (option A) with a $50 admission cost, or a park concert (option B), which costs $0 and happens at the same time. Use this information to help you fill in the table below.

	A high value on theatre choice (A)	A low value on theatre choice (A)
Out-of-pocket cost for (A)	$50	$50
Enjoyment of theatre concert (A)	$80	$60
Enjoyment of park concert (B)	$15	$15
Opportunity cost of A	$15	$15
Economic cost of A	50 + 15 = 65	65
Economic rent from A	80 − 65 = 15	60 − 65 = −5
Decision?	Go to A	Go to B

6. [Gains from trade]. Suppose that France and Germany both produce pastries and wine. The following table shows how much of each good each country can produce.

Germany has absolute advatge.

	Production if 100% of time is spent on one good
France	4 wine bottles or 8 pastries
Germany	5 wine bottles or 15 pastries

i. Calculate the opportunity cost of producing a bottle of wine in both France and Germany. Who has a comparative advantage in producing wine? In pastries?

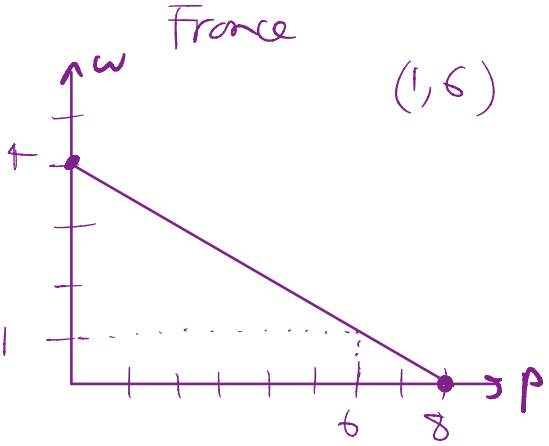
$4w = 8p \Rightarrow 1w = 2p \Rightarrow \frac{1}{2}w = 1p$

$5w = 15p \Rightarrow 1w = 3p \Rightarrow \frac{1}{3}w = 1p$

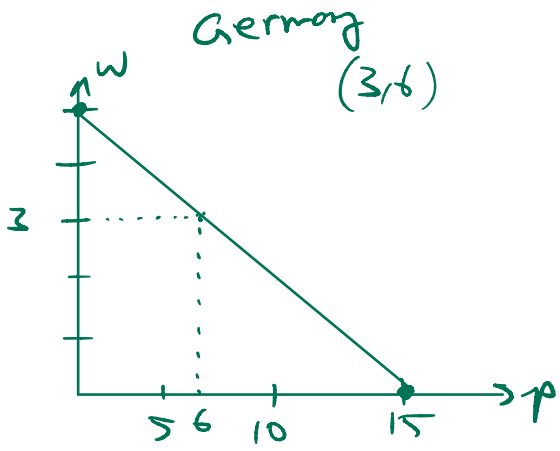
	OC for 1 wine	OC for 1 pastry
France	2p	$\frac{1}{2}w$
Germany	3p	$\frac{1}{3}w$

France has CA in wine Germany has CA in pastries.

ii. Suppose both nations are currently self-sufficient (no trade). France is producing 1 bottle of wine. How many pastries can they produce? Germany is producing 3 bottles of wine. How many pastries can they produce? Draw a PPF for wine and pastries for each country and indicate their production and consumption point under autarky.



slope $= -1/2$



slope $= -1/3$

iii. What terms of trade would be acceptable to the two countries if they were to trade?

$2p <$ OC for wine $< 3p$

$\frac{1}{3}w <$ OC for pastries $< \frac{1}{2}w$

iv. How much wine and pastries would be produced if France and Germany specialized according to their comparative advantage in preparation for trade. Find some acceptable

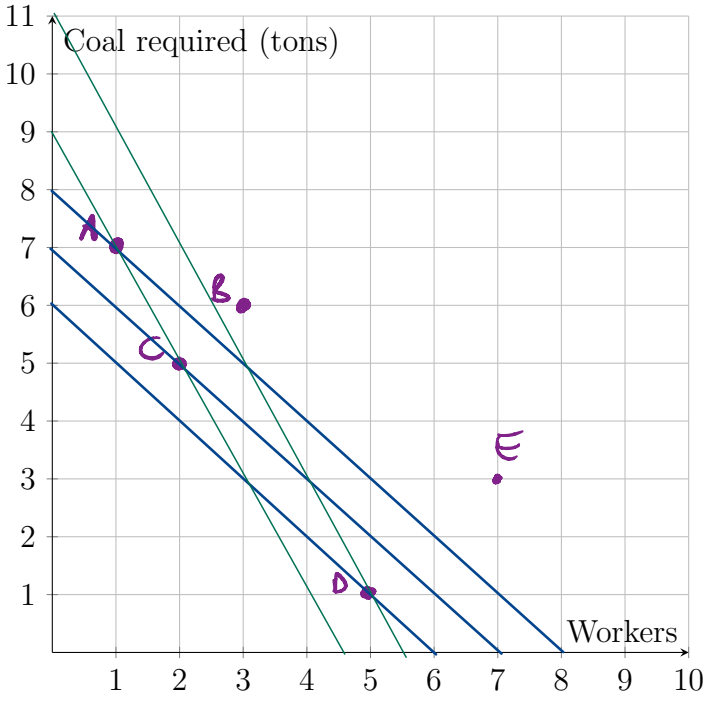
level of trade that makes both countries better off than they were in part ii.

		self sufficiency	specialization	Trade
France	wine	1	4	1
	potatoes	6	0	8 or (9)
Germany	wine	3	0	3
	potatoes	6	15	7 or (6)
Total	wine	4	4	4
	potatoes	12	15	15

7. [Isocost curves]. The following table gives different technologies that produce 100 meters of cloth.

Technology	A	B	C	D	E
Number of workers	1	3	2	5	7
Coal required (tons)	7	6	5	1	3

i. Draw a graph with workers on the x-axis and tons of coal on the y-axis. Locate and mark A, B, C, D, and E on the graph.



ii. Which technologies are dominated by other technologies? D > E , C > B

iii. Draw the isocost curve that passes through points A, C, and D when the wage is \$10 and the price of coal is \$10. Which technology is the optimal choice?

Workers , N Coal C

Cost, $Z = 10n + 10c$

$c = -1n + \frac{Z}{10}$ $(\because y = mx + c)$

D is optimal choice

iv. Now draw the isocost curves when $w = 20$ and $p = 10$. Does the choice of technologies change? What does this tell us about the adoption of capital-intensive production when the relative price of labor is high?

$Z = 20n + 10c \Rightarrow c = -2n + \frac{Z}{10}$

Curves in green. A, C > D

8. [Opportunity costs]. The British government introduces legislation giving universities the option to raise their tuition fees. Most choose to increase annual tuition fees for students from £3,000 to £9,000. Does this mean that the cost of going to university has tripled? (Think about how the answer to this question might differ depending on whether you take an accounting perspective or an economic perspective). To simplify, assume that the tuition fee is an 'out of pocket' cost.

Ans. Accounting cost = out of pocket cost, which has increased by 200%. But consider the opportunity cost of going to college, which is giving up on wages from working in a job instead of going to college. Assume a student can earn £18,000 per year working. Then,

Economic cost (before) $= 3,000 + 18,000 = 21,000$.

Economic cost (now) $= 9,000 + 18,000 = 27,000$.

So cost increased by $\sim 28\%$ (not tripled).