Lecture 8(iii)

Announcements

Start working on “Consumer Theory” worksheet (at week 9 on Canvas)

And start looking at practice midterms at week 10

Lecture

Continuing Consumer Theory from Lec 8(ii)

1. Review last class: Perfect Substitutes case

2. Perfect Complements.

3. Goldy Gopher. In between extreme cases.

4. Impact on demand from change in income.

5. Impact on demand from change in price. (Income and Substitution Effects)

Case 1: Hawkeye (Perfect Substitutes)

Hawkeye gets utility from calories (the more the better).

Suppose pizza 200 calories and beer is 200 calories

Utility = $200*Q_{pizza} + 200*Q_{beer}$

What bundle maximizes utility?

Remember $P_{beer} = 2$, $P_{pizza} = 4$.

Last Class: drew 3 indifference curves

Indifference curve through $Q_{beer} = 12$ and $Q_{pizza} = 0$

Indifference curve through $Q_{beer} = 14$ and $Q_{pizza} = 0$

Indifference curve through $Q_{beer} = 6$ and $Q_{pizza} = 0$

Rule: pick the bundle on the budget constraint that gets to the highest indifference curve

optimal consumption bundle

The slope of indifference curve is The Marginal Rate of Substitution

Here one for one. (value of one more pizza slice in terms of beer).

Look again at $Q_{beer} = 12$ and $Q_{pizza} = 0$ on the budget constraint. At this point:

Value of one more unit of pizza:
one beer

Cost of one more unit of pizza:
two beers

Case 2: Bucky Badger Fixed Proportions

also called perfect complements

Very particular:

A meal: one beer and one pizza

Utility equals number of meals.

Suppose Bucky has I = 24 just like before and P_{pizza} = \$4 and P_{beer} =\$2

What is optimal consumption bundle? 4 pizza, 4 beer

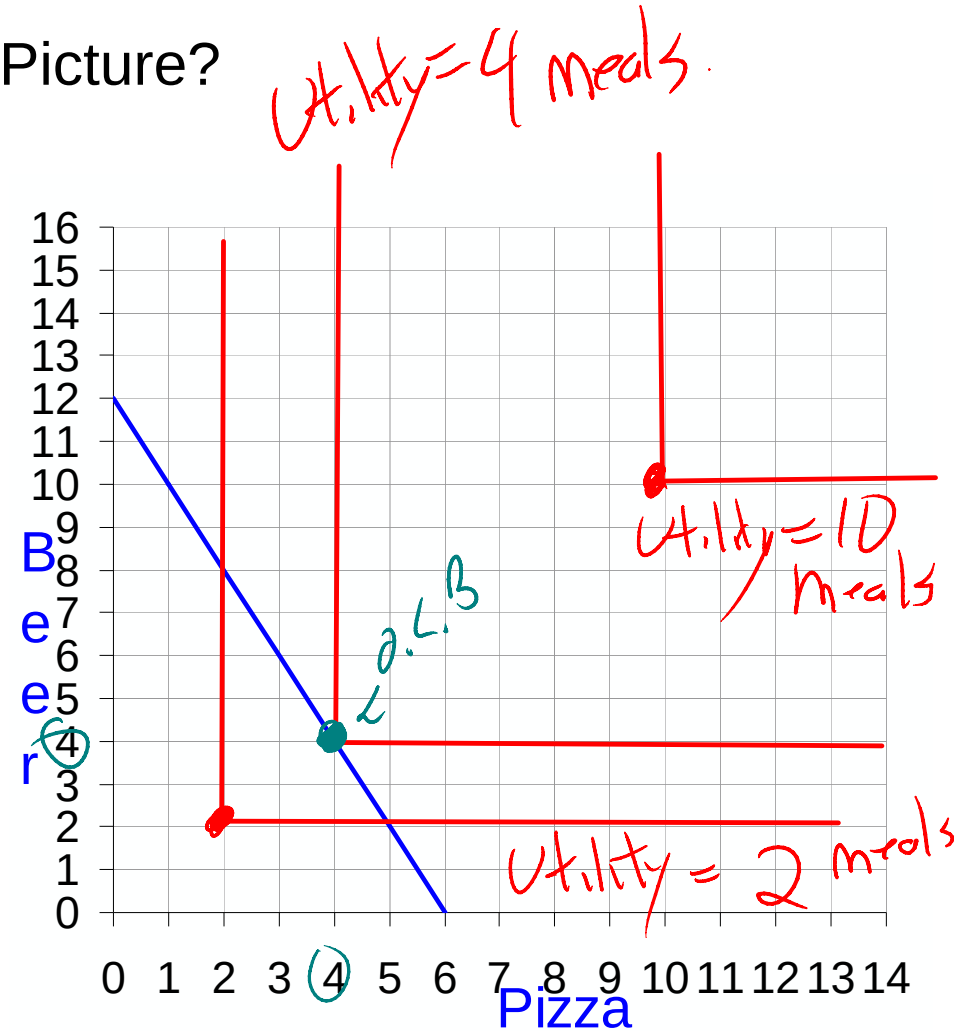
How much for a meal? \$4 pizza + \$2 beer = \$6

How many meals can he buy?

$\frac{\$24}{\$6} = 4$

So $Q_{pizza} = 4$ and $Q_{beer} = 4$ in optimal consumption bundle.

Picture?



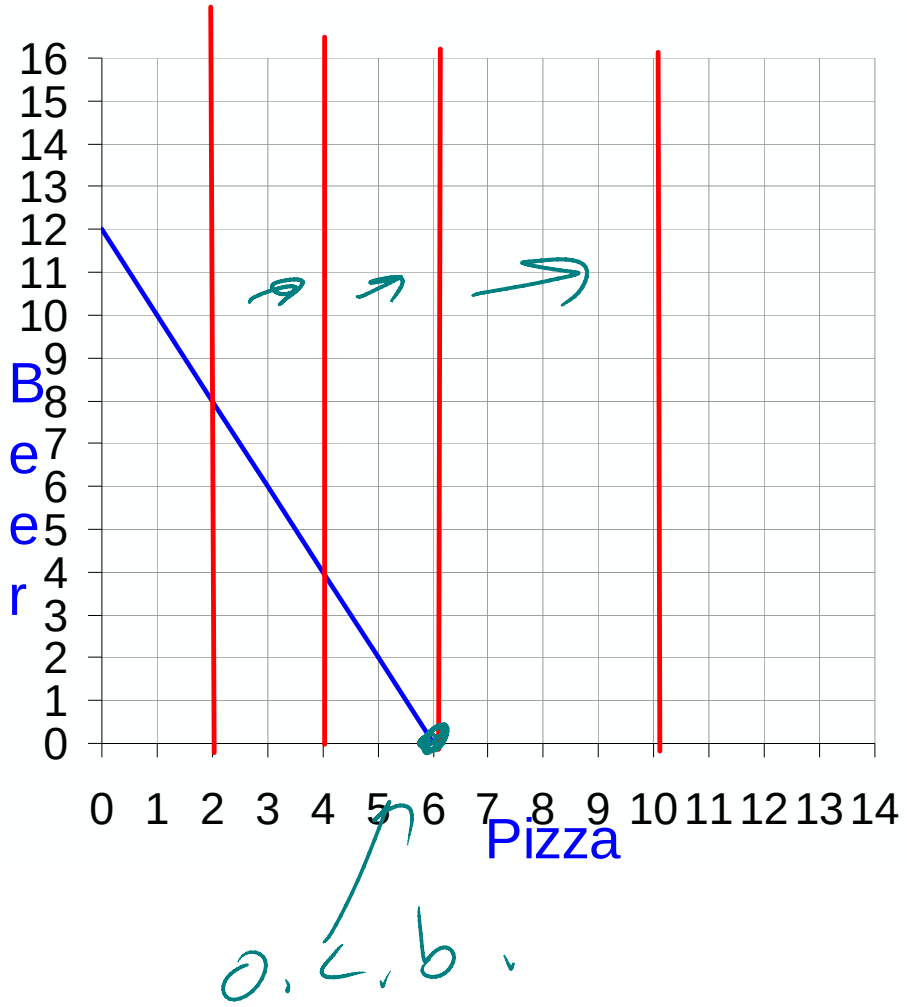
Bucky's optimal consumption bundle is 4 pizza and 4 beer.

Test Your Knowledge
Meet Rutgers Scarlet Knight

From New York city area and only cares about pizza

What do his indifference curves look like? Same budget

- Income: I = $24
- Price of pizza: P_{pizza} = $4 slice
- Price of beer: P_{beer} = $2 bottle



Case 3: Goldy Gopher

In between these extreme cases

Diminishing marginal rate of substitution.

Meaning, as he eat more pizza, his willingness to give up beer to get even more pizza goes down.

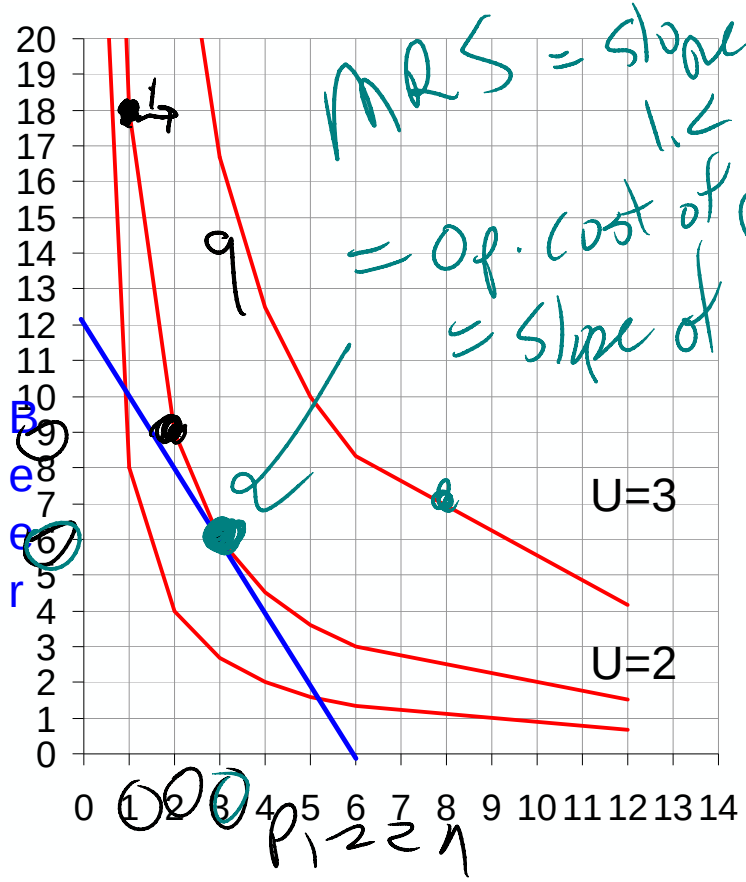
Means indifference curves have a bowed shaped.

From Goldy's indifference curve we can see he is indifferent between
1 pizza/18 beer
2 pizza/9 beer
and 3 pizza/6 beer

We can see these indifference curves on the next page.

If Goldy starts with 1 pizza and 18 beer he is hungry (and sloshed!). To get one more slice he is willing to give up 9 beer. (His MRS at this point is 9 beers for 1 pizza). But if he starts with 2 pizza and 9 beers, to get one more slice he is only willing to give up 3 beers.

His MRS (willingness to pay for pizza in terms of beer) decreases with more pizza. This gives the indifference curves a "bowed" shape.



Suppose

P_{Beer} = \$2, P_{Pizza} = \$4, I = \$24

Optimal consumption bundle is

3 pizza dn 6 beers.

At optimum two conditions:

(1) On budget constraint and

(2)

$$MRS = \frac{P_{pizza}}{P_{beer}}$$

Slope of indifference curve

Slope of budget constraint

Marginal benefit of pizza (in beer)

= 2

Marginal cost of pizza (in beer)

= 2

What are we doing here?
Constructing Demand Curves

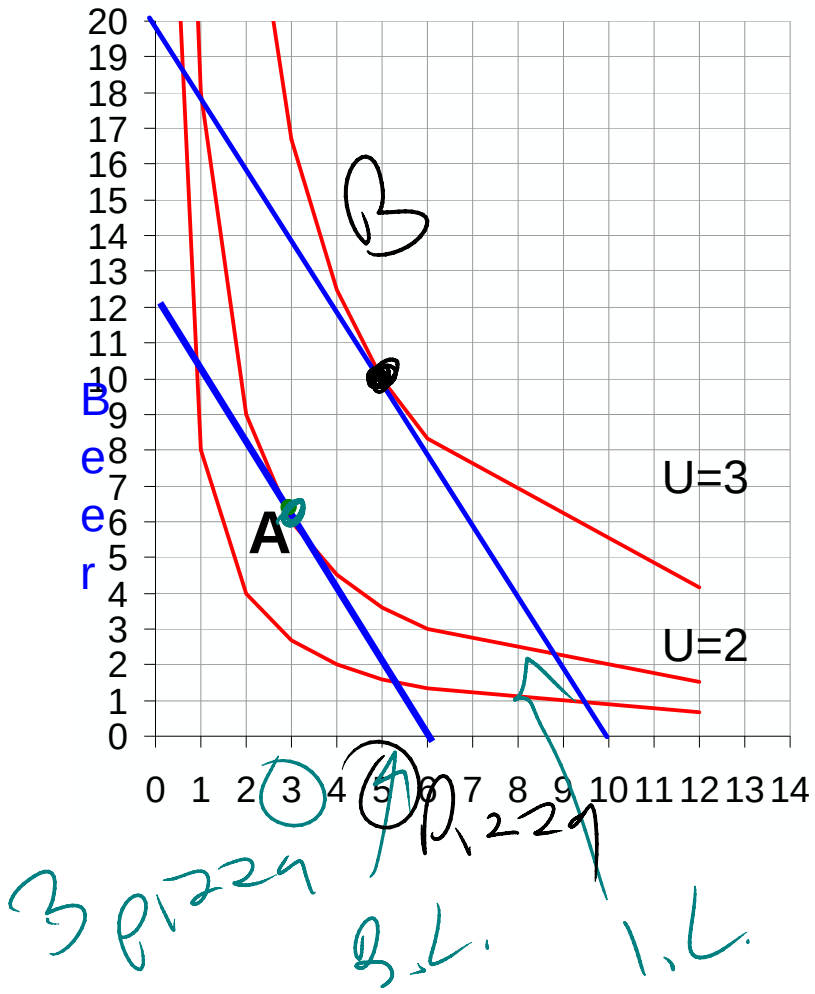
Demand for pizza depends upon?

- Own price (here $4)
- price of other stuff (here price of beer= $2)
- Income (here $24)
- Preferences (Here Goldy)

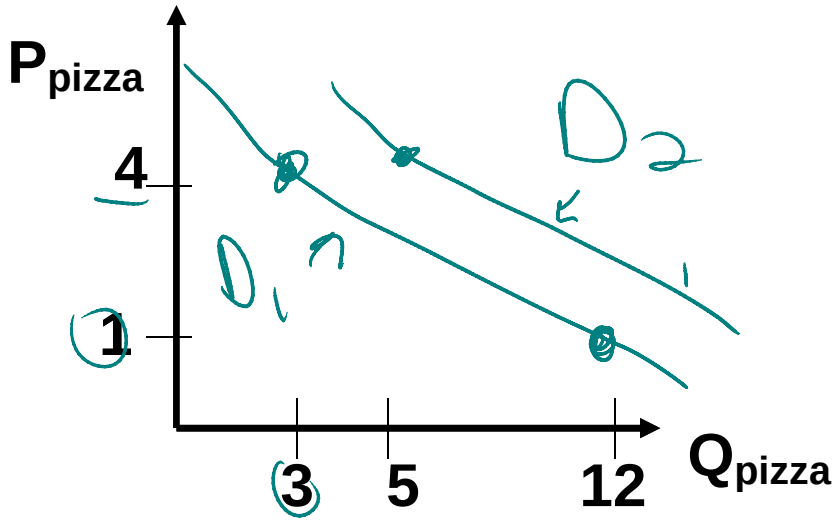
Put this together, get point A
Quantity demanded = 3 Pizza
(and 6 beers)

Point where:
(1) On budget constraint and

(2) MRS = P_{pizza}/P_{beer}



We use the new graph to determine our old graph
(Demand Curve from the beginning of the semester)



Lower price to $1, move along demand

Change income, shift demand
At Income = $40: Pick optimal consumption bundle and label it **B**

At Income = $40, Goldy consumes:

5 Pizza

10 Beer

Pizza and beer are normal goods

But what would an inferior good look like on new graph?
D1 on other page is demand curve for pizza of Goldy when income =$24 and price of beer is $2. D2 is how demand shifts when incomd is $40 and everything else is the same.

Forget Beer and Pizza for now and let's suppose Spam and Steak are the only goods

P

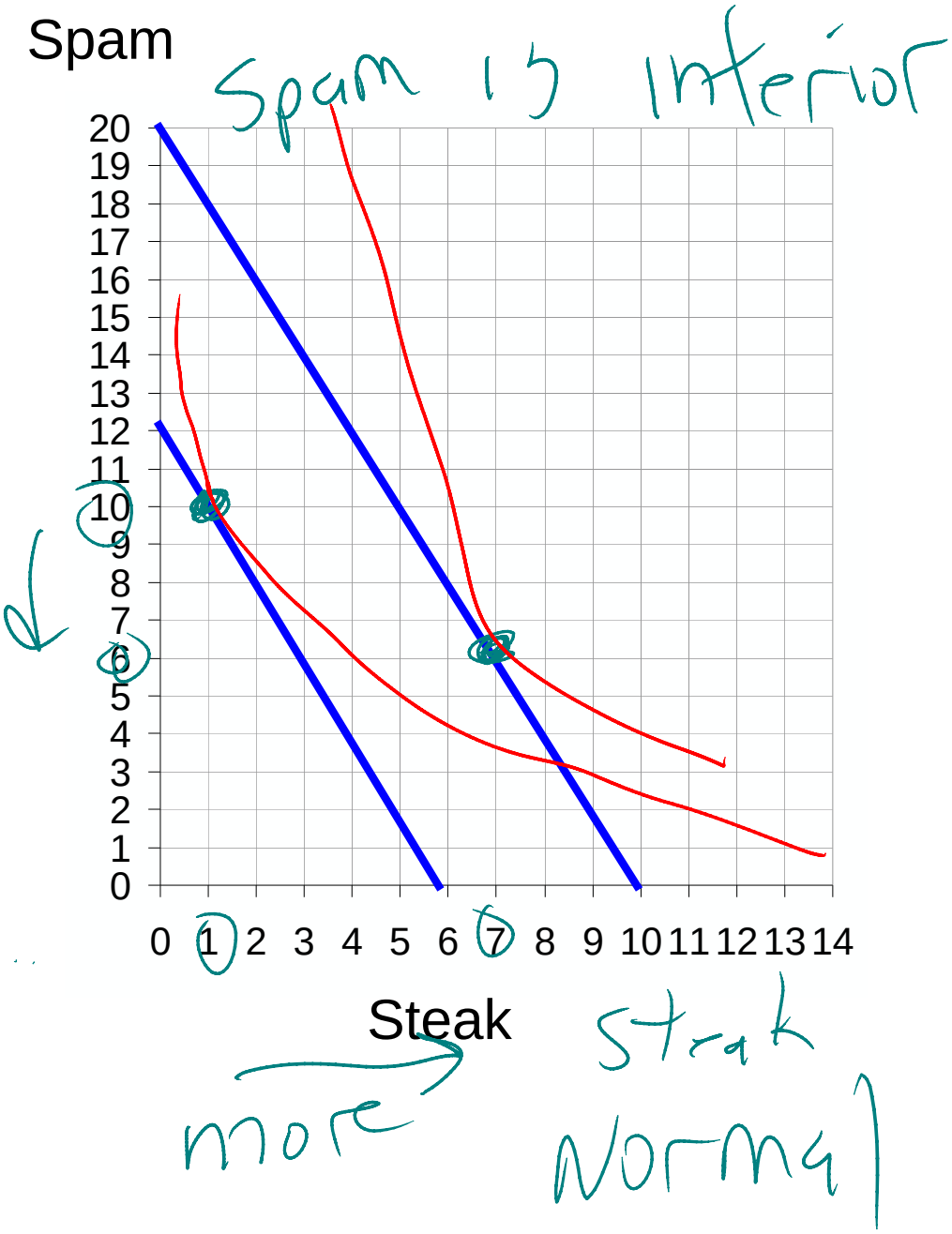
$_{spam}$ = \$2, P_{steak} = \$4

I = \$24 initially

10 spam
1 steak

I = \$40, new income

6 spam
7 steak



1. Income and Substitution Effects

At optimum two conditions:

(1) $MRS = \frac{P_{pizza}}{P_{beer}}$

(2) On budget constraint

If initially at optimum and price of pizza falls, then **both conditions are messed up**.

Breaking things down into **income** and **substitution** effects, we fix things one at a time.

(1) Fix MRS=price ratio condition

(2) Shift to fix budget constraint.

Definitions:

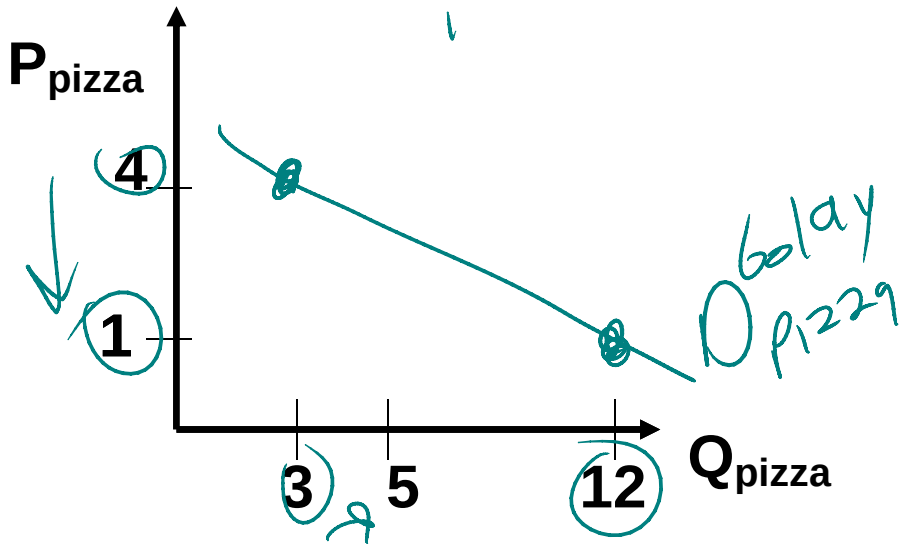
1. Substitution effect. Effect of change in opportunity cost (by spending power held fixed so stay on same indifference curve)
   - buy more if price falls

2. Income effect

The effect of change in income holding opportunity cost fixed at the new level.
   - direction of effect depends upon whether normal or inferior

Let's start with the **total effect**. That should be easy

Our old graph of demand curve from the beginning of the semester



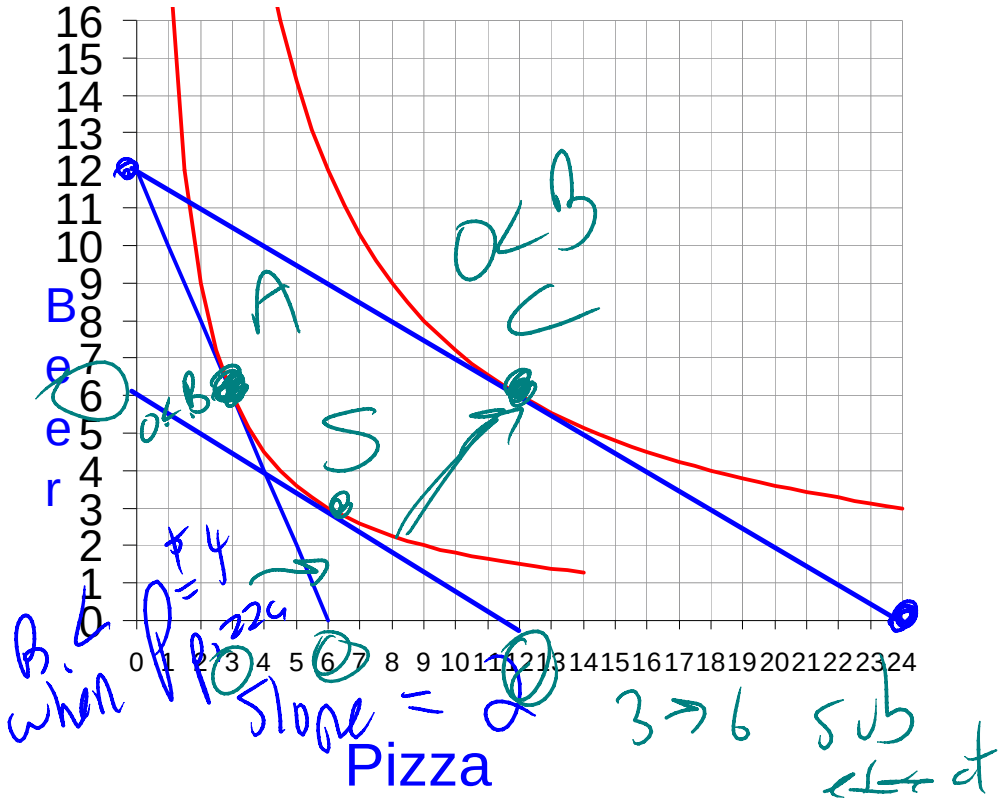
Start at price equal \$4, lower price to \$1, is a **movement along** demand

We will do income and substitution part next week.

I = \$24 and P_{Beer}=\$2 fixed

P_{Pizza} = \$4: Label **OCB A**

P_{Pizza} = \$1: Label **OCB C**



(OCB is Optimal Consumption Bundle)

Movement **A** to **C** is **total effect** of price decrease

Breakdown into **substitution effect**: New opportunity cost, but original indifference curve.

Label this **S**

Substitution Effect is movement from **A** to **S** 3 pizza to 6 pizza

3 pizza increase

Income Effect is movement from **S** to **C** 6 pizza to 12 pizza

6 pizza increase

When price falls:

Substitution effect:
buy more (because opportunity cost is lower)

Income effect (since original bundle is cheaper than before so have income left over)
normal good: buy more
inferior good: buy less

So if normal, Sub and Inc work same way

If inferior, Sub and Inc go different ways.