# Principles of Economics

## Discussion Session 7: Consumer Choice

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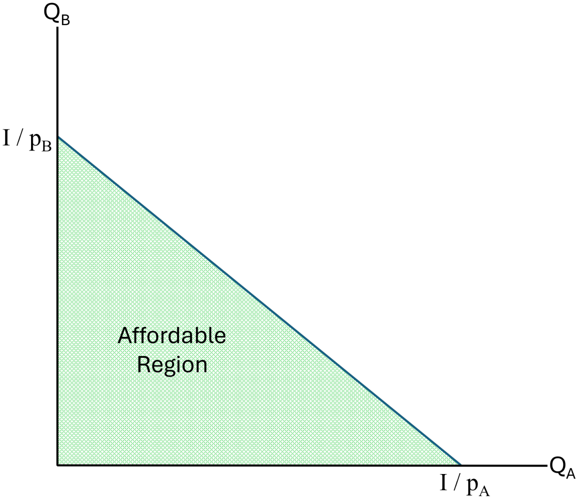
# The Budget Constraint

Describes all combinations of $Q_A$ and $Q_B$ that are within your budget.



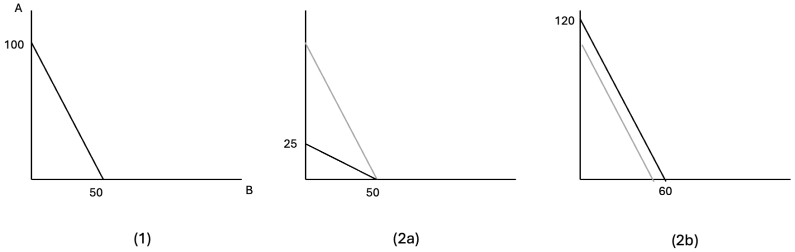
## Exercise 1: Budget Constraint

Q1: Consider two goods, A and B, with $P_A = \$1$ and $P_B = \$2$. Suppose income is \$100.

1. Draw the budget constraint and label the intercepts.
2. How will the budget constraint be affected if
   - $P_A$ increases to \$4?
   - Income increases to \$120?

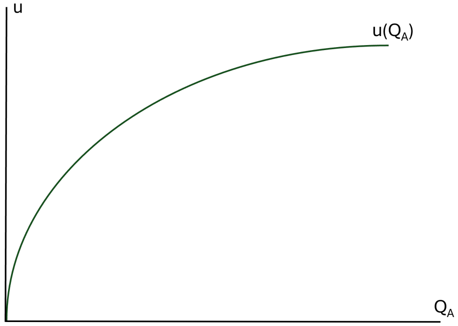
# Exercise 1: Budget Constraint

Solution:



# Utility Function

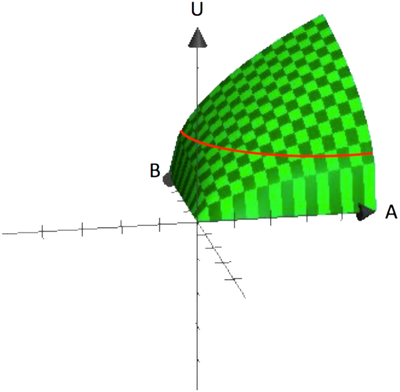
- Describes the satisfaction or "utility" that one receives from consuming a good
- Concave $\implies$ diminishing marginal utility




- But what if we want to compare the utility from both goods $A$ and $B$?

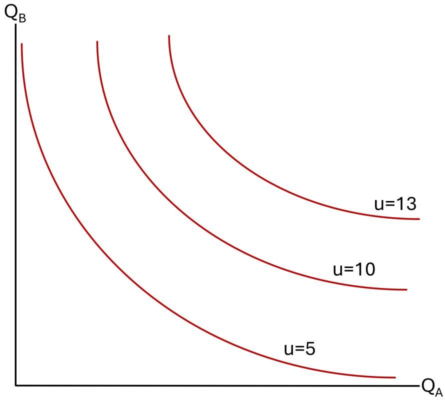
# Utility in 3 Dimensions

- Add another axis!
  $\implies$ Utility depends on $Q_A$ and $Q_B$
- Can translate this to 2D by depicting curves where utility is constant
  - Like a topographical map



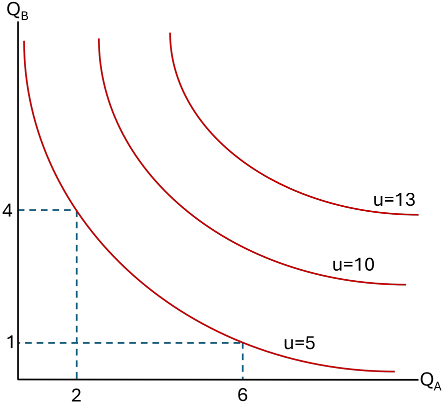
# Indifference Curves

- Every combination of *A* and *B* along the same curve gives the same utility
- The consumer is "indifferent" between all points on the same curve



# Marginal Rate of Substitution

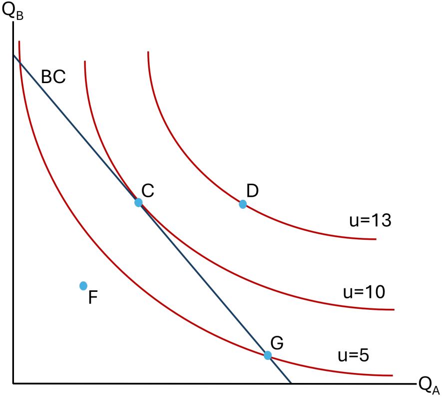
- MRS: How much $B$ I'm willing to give up for one unit of $A$.
- Just the negative slope of the indifference curve between two points: $MRS = -(B_1 - B_2)/(A_1 - A_2)$




- In this case, $MRS = 3/4$. "I can give up 3/4 bananas for 1 apple and be indifferent".

# Optimal Consumption Point

- Consumer maximizes utility subject to budget constraint.
- "Climb as high up the hill as possible" while staying behind the BC.



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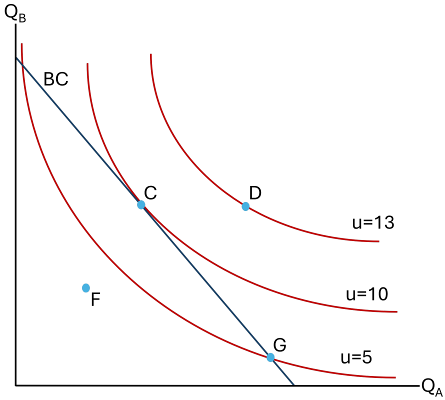


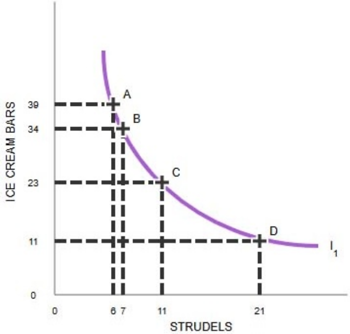

- At point $C$, the (negative) slope of the BC is equal to the MRS (slope of the IC)

## Exercise 2: Indifference Curve & Optimal Choice

Q1: Consider the following indifference curve.

1. Calculate the marginal rate of substitution (MRS) from point B to C
2. Suppose the price of ice cream bars and strudels are both \$10. Your income is \$110. Draw and label your budget constraint and mark the optimal choice in relation to an indifference curve.
3. Suppose your income increases to \$220. How will your optimal choice change if
   - ice cream bar is a normal good?
   - ice cream bar is an inferior good?

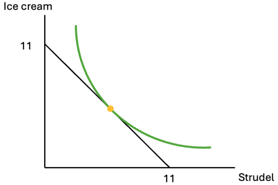
   How must your indifference curves be shaped in each of those scenarios?



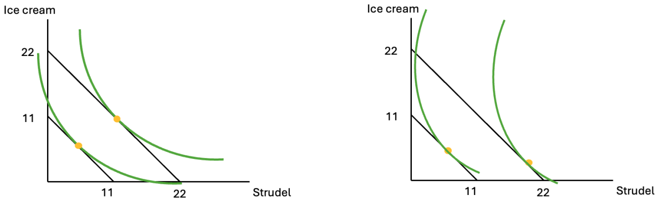
# Exercise 2: Indifference Curve & Optimal Choice

Solution:

1. $MRS = \frac{34-23}{11-7} = \frac{11}{4}$
2. The optimal choice is the tangent point of the indifference curve to the budget line




3. Changes in optimal choice:




(a) Normal Good

(b) Inferior Good

# Externalities

- When a market transaction effects a third party.
- **Negative Externality:** The third party is negatively effected.
  - Quantity produced is too high.
  - Policy response is a tax.
- **Positive Externality:** The third party is positively effected.
  - Quantity produced is too low.
  - Policy response is a subsidy.

# Exercise 3: Externalities

Q1: Consider the following market for beers:

- $Q^D = 20 - P$
- $Q^S = P - 2$

Suppose that drinking beers at a party makes the party more fun for everybody, including non-drinkers, to the tune of \$2 of fun per beer.

1. Find the market equilibrium quantity.
2. What kind of externality is this?
3. What is the appropriate policy response by non-drinkers?
4. How big should the response be?
5. Assume the policy is implemented. Find the socially optimal quantity.

## Exercise 3: Externalities

Solution:

1. $P = 11, \ Q = 9$
2. Positive
3. Non-drinkers should subsidize beers for drinkers
4. The size of the externality: $\sigma = \$2$
5. $P^D = P^S - 2$ , so

$$\begin{aligned} Q^D(P^D) &= Q^S(P^S) \\ 20 - P^D &= P^S - 2 \\ 20 - (P^S - 2) &= P^S - 2 \\ \implies \ P^S &= 12, \\ P^D &= 10, \\ Q^{\text{optimal}} &= 10. \end{aligned}$$