EC2101: Microeconomic Analysis I

Lecture 1

Theory of the Consumer

- Preference Relation
- Indifference Curve
- Marginal Rate of Substitution
- Types of Preferences

Key Questions in Consumer Theory

- **Consumer choice**
  - How do consumers choose what to buy and how much of a good to buy?
- **Demand function**
  - How do consumers' choices change with prices and with income?
- **Consumer welfare**
  - How do we measure the gain or loss to consumers when prices change?

Consumer Choice

- How do consumers choose what to buy and how much of a good to buy?

- Assumptions:
  - Consumers are rational.
    - Specifically, consumers maximize utility.
  - Consumers are fully informed.
  - Consumers face budget constraints.

Consumer Choice

- What do consumers like?
  - Preference
- What are the prices of the various options?
- How much is your income?
  - Budget constraint

Preference Relation

Preference Relation

- How do consumers rank two goods?
  - A consumer (strictly) prefers *A* to *B*: $A \succ B$
  - A consumer is indifferent between *A* and *B*: $A \sim B$
  - A consumer weakly prefers *A* to *B*: $A \succcurlyeq B$

Consumption Basket

	Gelato	Coffee	Other Stuff
Basket *A*	3 units	3 units	9 units
Basket *B*	4 units	2 units	8 units
Basket *C*	5 units	1 unit	10 units

- For simplicity, assume a consumption basket consists of two goods, e.g., gelato and coffee.

Fundamental Assumptions on Preferences

- Completeness
  - For any two baskets *A* and *B*,
    - either $A \succ B$
    - or $B \succ A$
    - or $A \sim B$.
- A consumer has complete preferences
  if she can compare any two goods or any two baskets.

Fundamental Assumptions on Preferences

- Transitivity
  - If $A \succ B$ and $B \succ C$, then $A \succ C$.
  - If $A \sim B$ and $B \sim C$, then $A \sim C$.
- A consumer has transitive preferences if her preferences are internally consistent.

Exercise 1.1

Preference Relation

Write the following statements using preference relations.

1. Peter prefers *A* to *B* but is indifferent between *A* and *C*.

2. Susan derives the same amount of utility from *A* as she does from *B*; she has a weak preference for *C* over *A*.

3. For Edmund, *B* gives him the greatest utility, and *A* the least.

4. Lucy derives at least as much utility from *C* as she does from *B*, and at least as much utility from *B* as she does from *A*.

Exercise 1.2

Preference Relation and Transitivity

Suppose Aslan's preferences satisfy completeness and transitivity. We know that $A \succ B$, $A \succ C$, and $C \sim D$. Indicate whether the following inferences are true or false.

1. $A \succ D$
2. $B \sim C$
3. $B \succ C$
4. $B \succ D$

Exercise 1.3

Preference vs. Choice

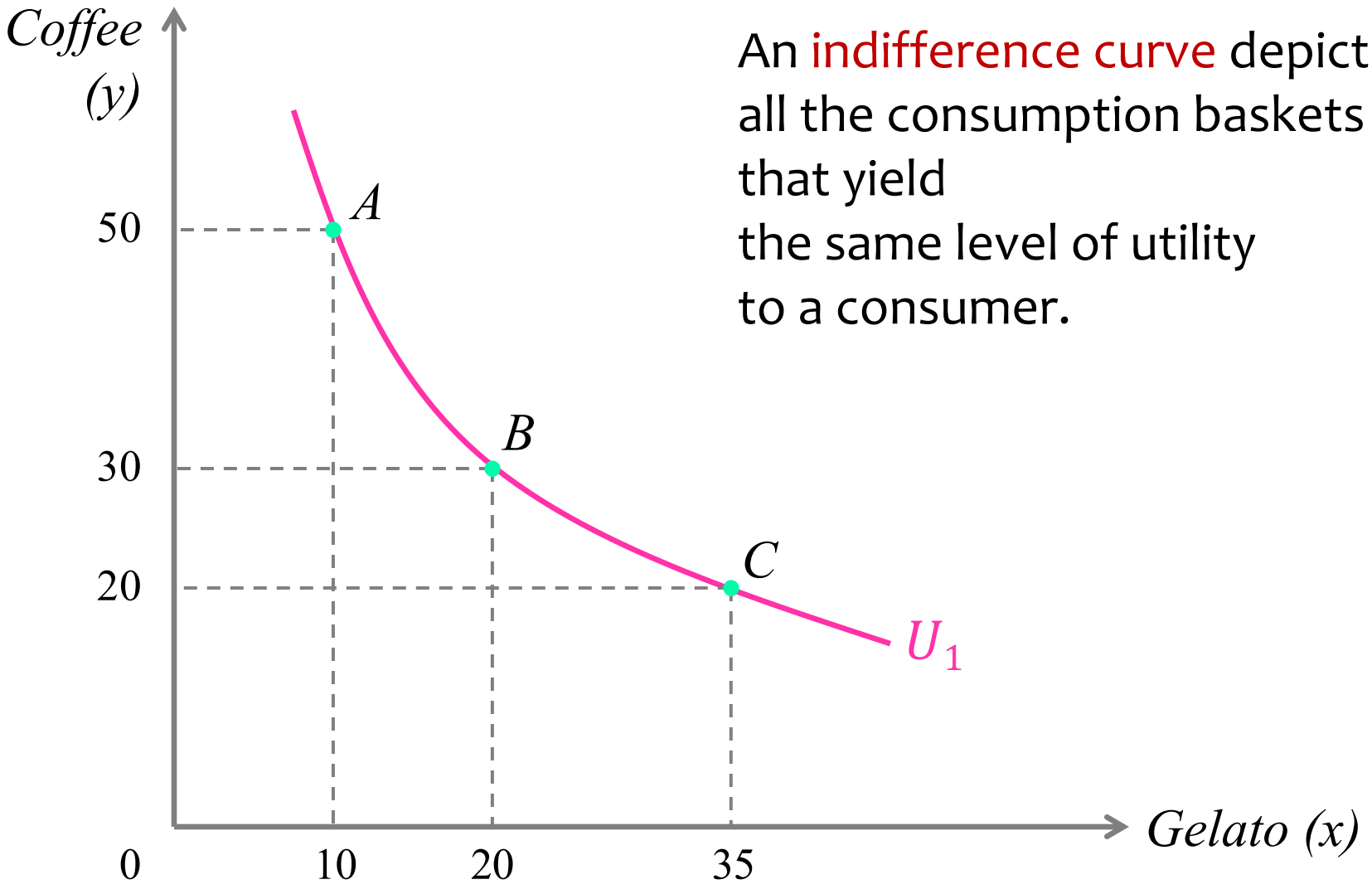
- Suppose you need to fly from Singapore to London. You are considering two options:
  - Economy class
  - Business class
- Which option do you prefer?
- Which option would you choose?

Indifference Curve

Representing Preferences on a Graph

- Suppose a consumer is indifferent between baskets *A*, *B*, and *C*:
  - *A*: 10 pints of gelato and 50 cups of coffee.
  - *B*: 20 pints of gelato and 30 cups of coffee.
  - *C*: 35 pints of gelato and 20 cups of coffee.

Indifference Curve

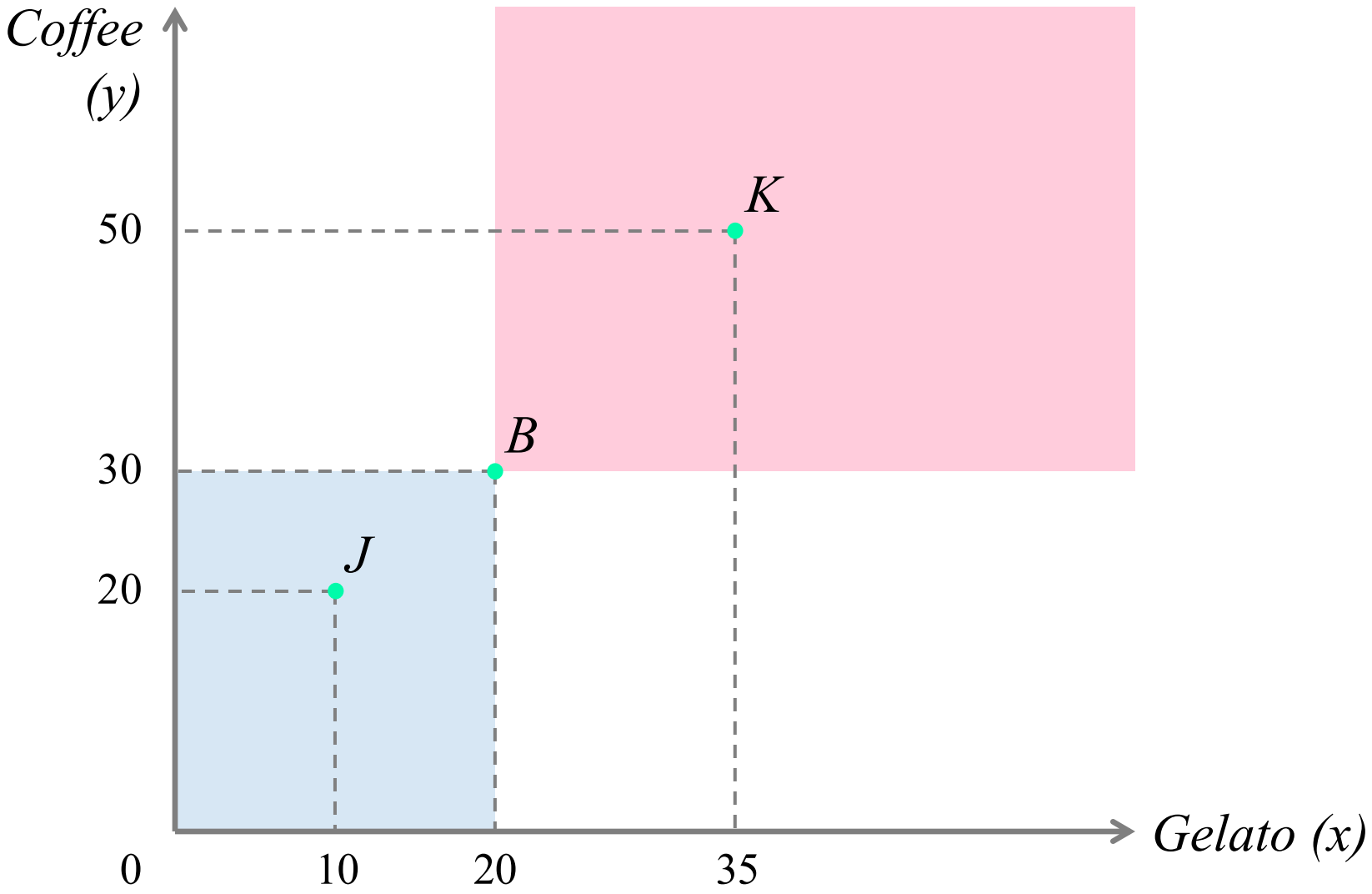


An indifference curve depicts all the consumption baskets that yield the same level of utility to a consumer.

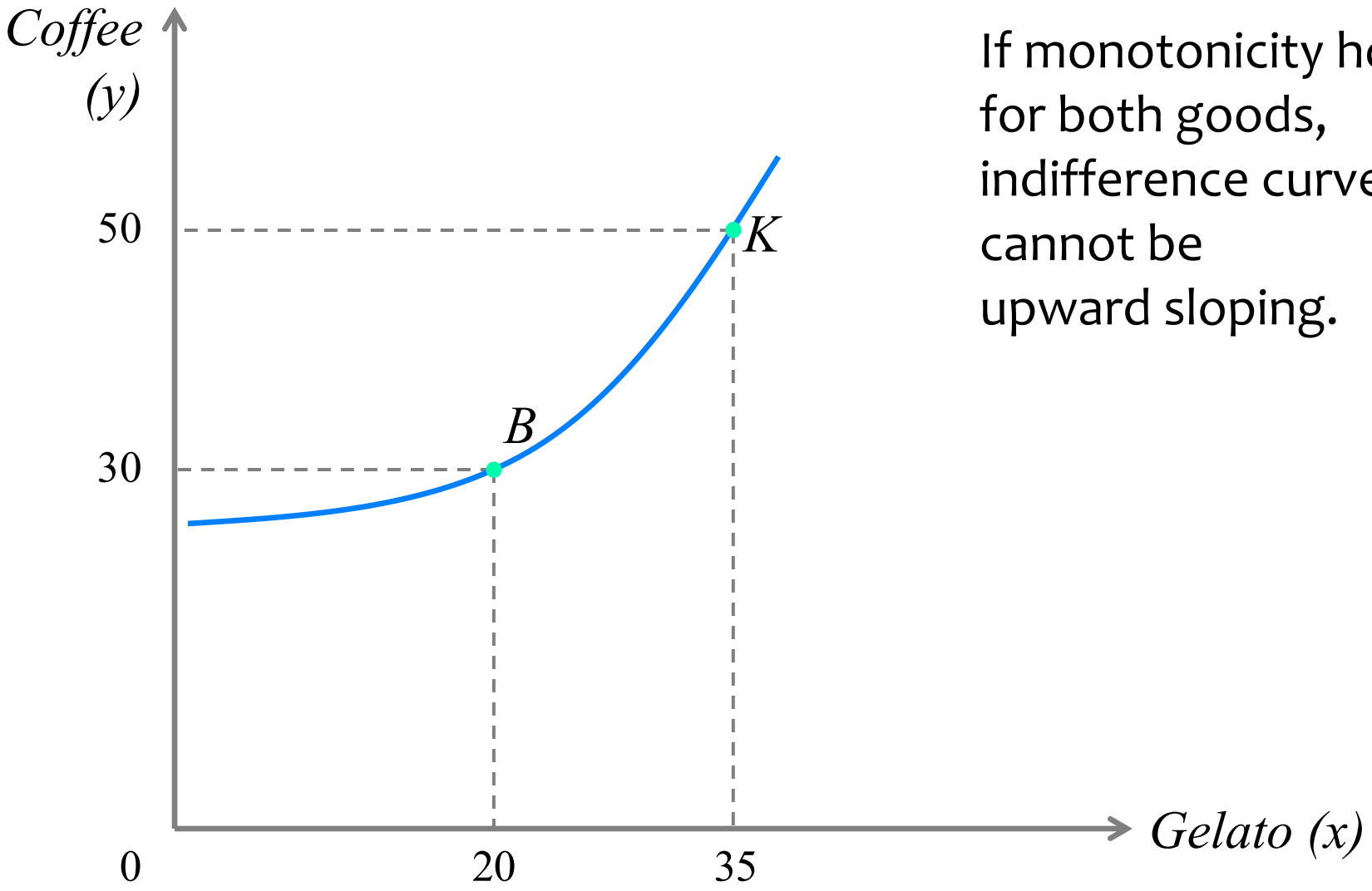
Additional Assumption on Preferences

- Monotonicity
  - The good is desirable.
  - Consuming more of the good increases utility, e.g.,
    - 2 pints of gelato and 4 cups of coffee is preferred to 2 pints of gelato and 2 cups of coffee.
    - 2 pints of gelato and 4 cups of coffee is preferred to 1 pint of gelato and 4 cups of coffee.
    - 2 pints of gelato and 4 cups of coffee is preferred to 1 pint of gelato and 2 cups of coffee.

Which Baskets are Preferred to *B*?

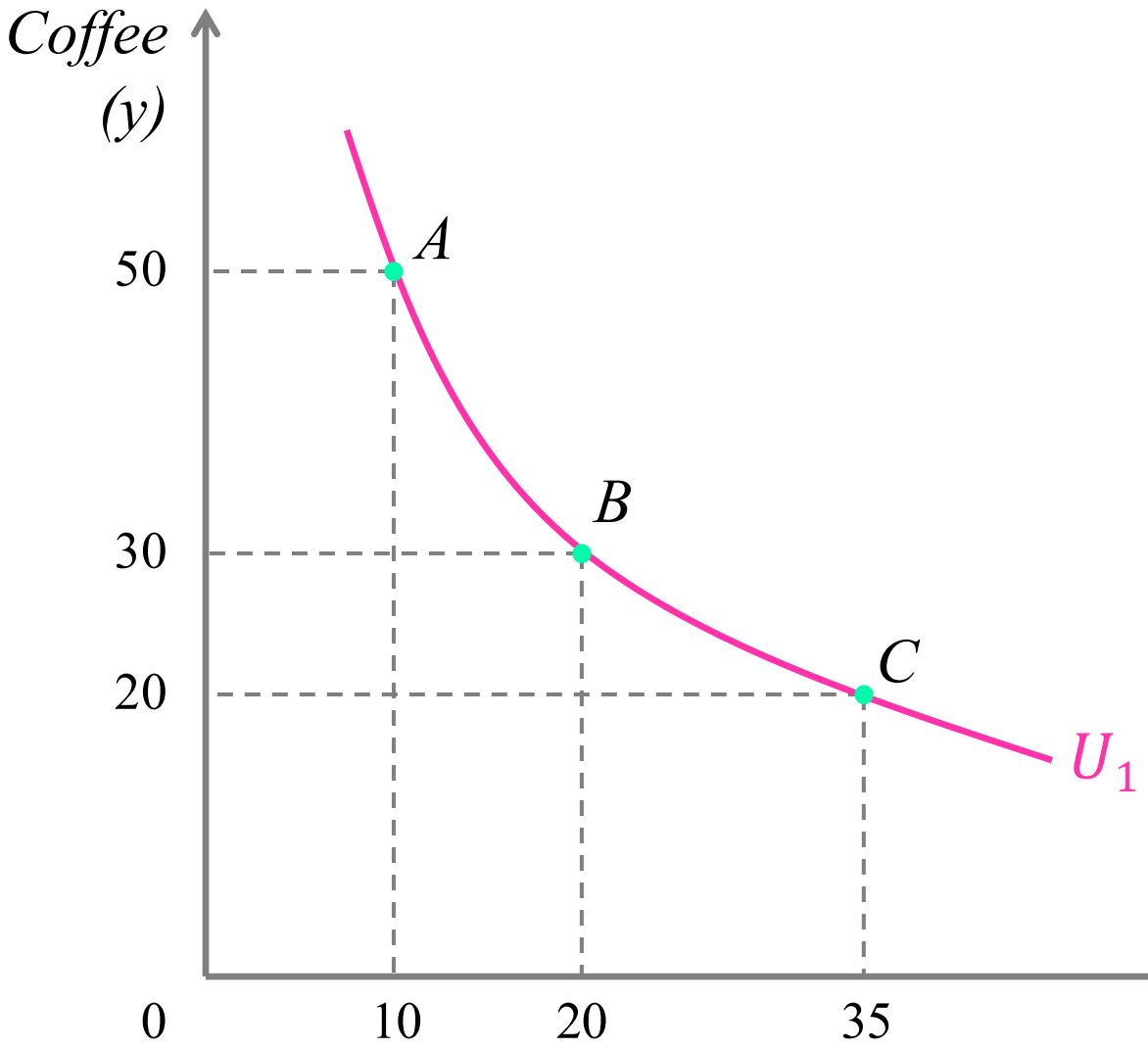


Can Indifference Curves Slope Upwards?



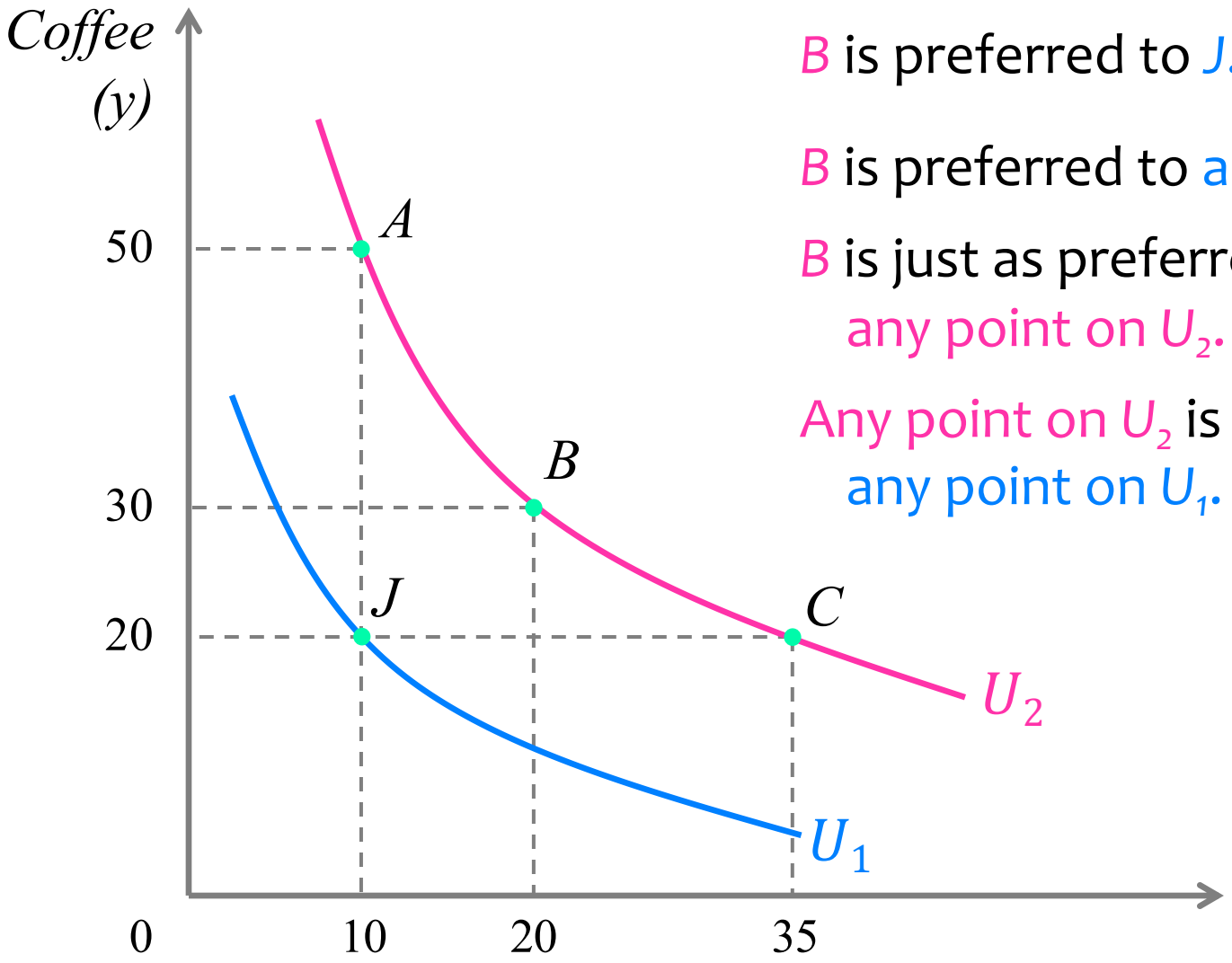
If monotonicity holds for both goods, indifference curves cannot be upward sloping.

Can Indifference Curves Slope Upwards?



If monotonicity holds for both goods, indifference curves must be downward sloping.

Which Indifference Curve Yields Greater Utility?



B is preferred to *J*.

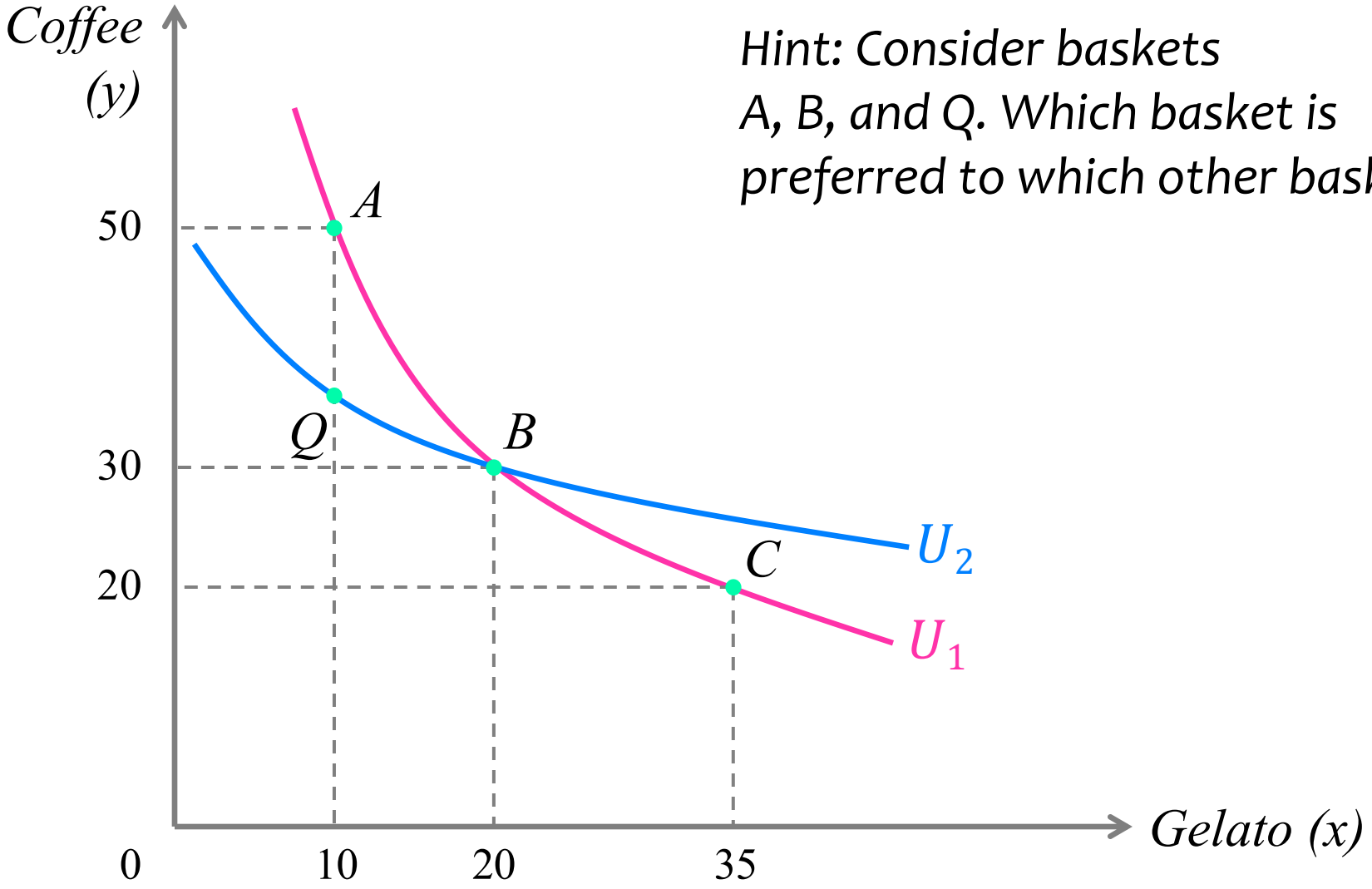
B is preferred to any point on U_1.

B is just as preferred as any point on U_2.

Any point on U_2 is preferred to any point on U_1.

Exercise 1.4

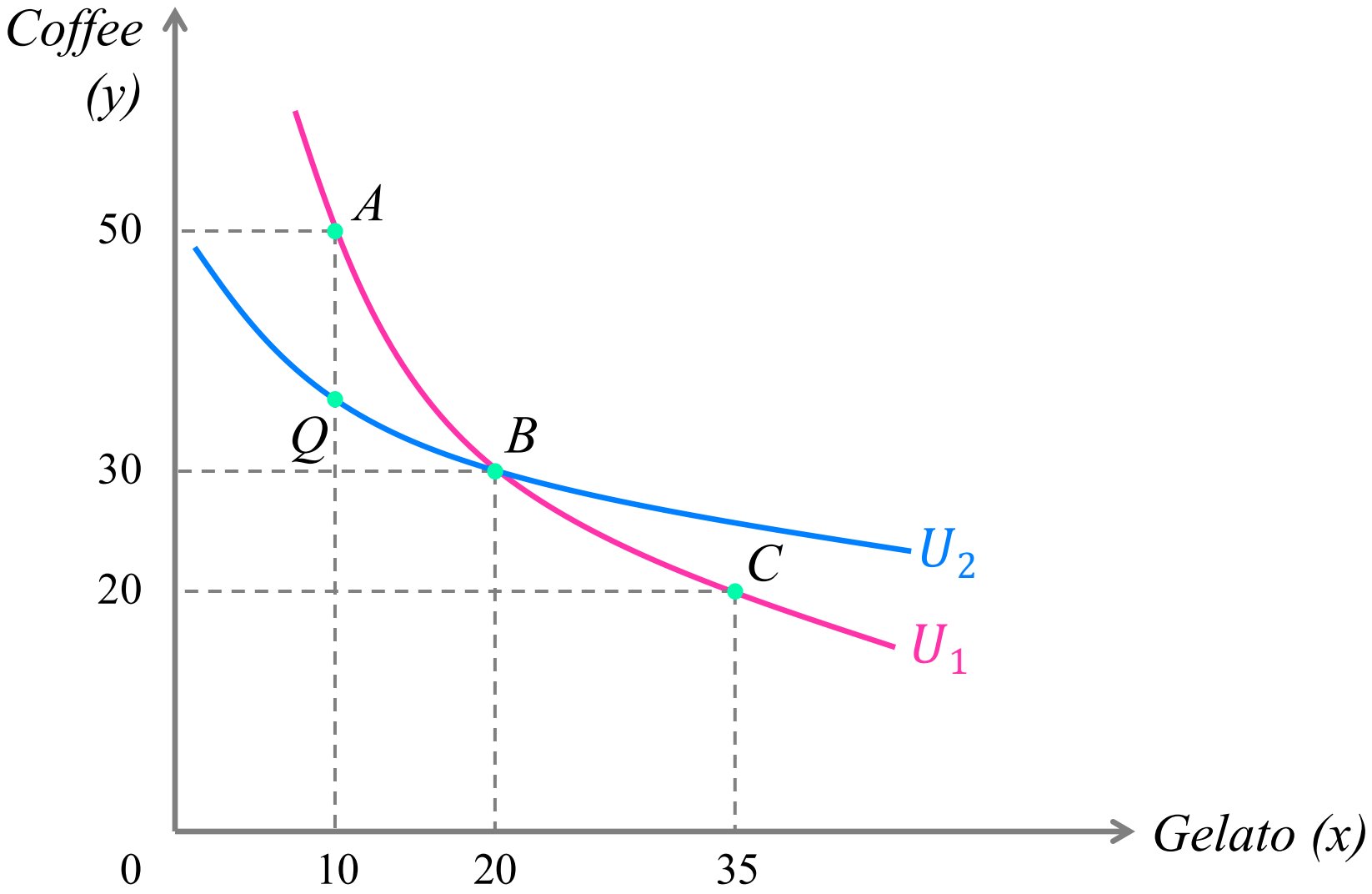
Can Indifference Curves Intersect?



Hint: Consider baskets A, B, and Q. Which basket is preferred to which other basket?

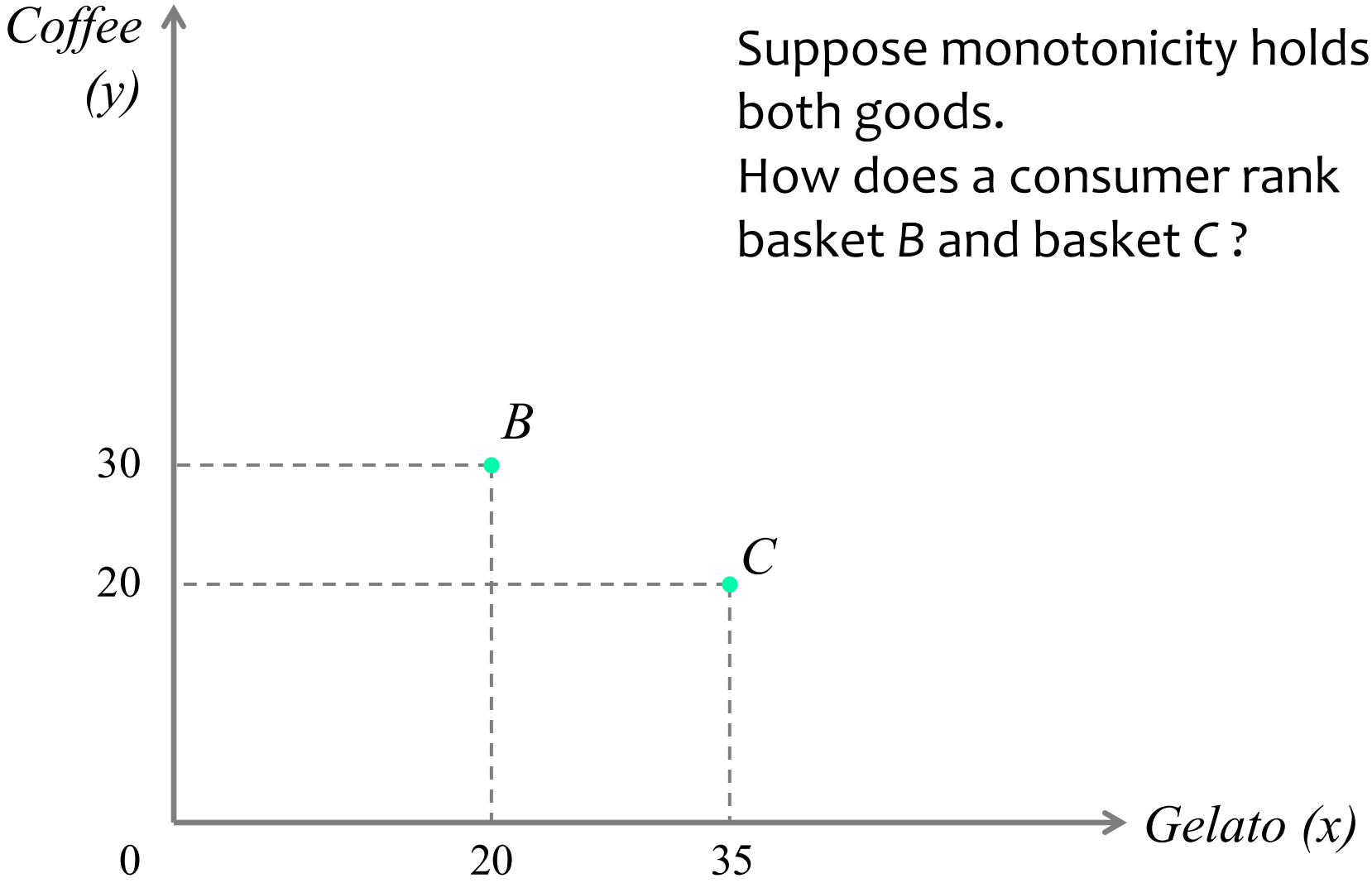
Exercise 1.4

Can Indifference Curves Intersect?



Exercise 1.5

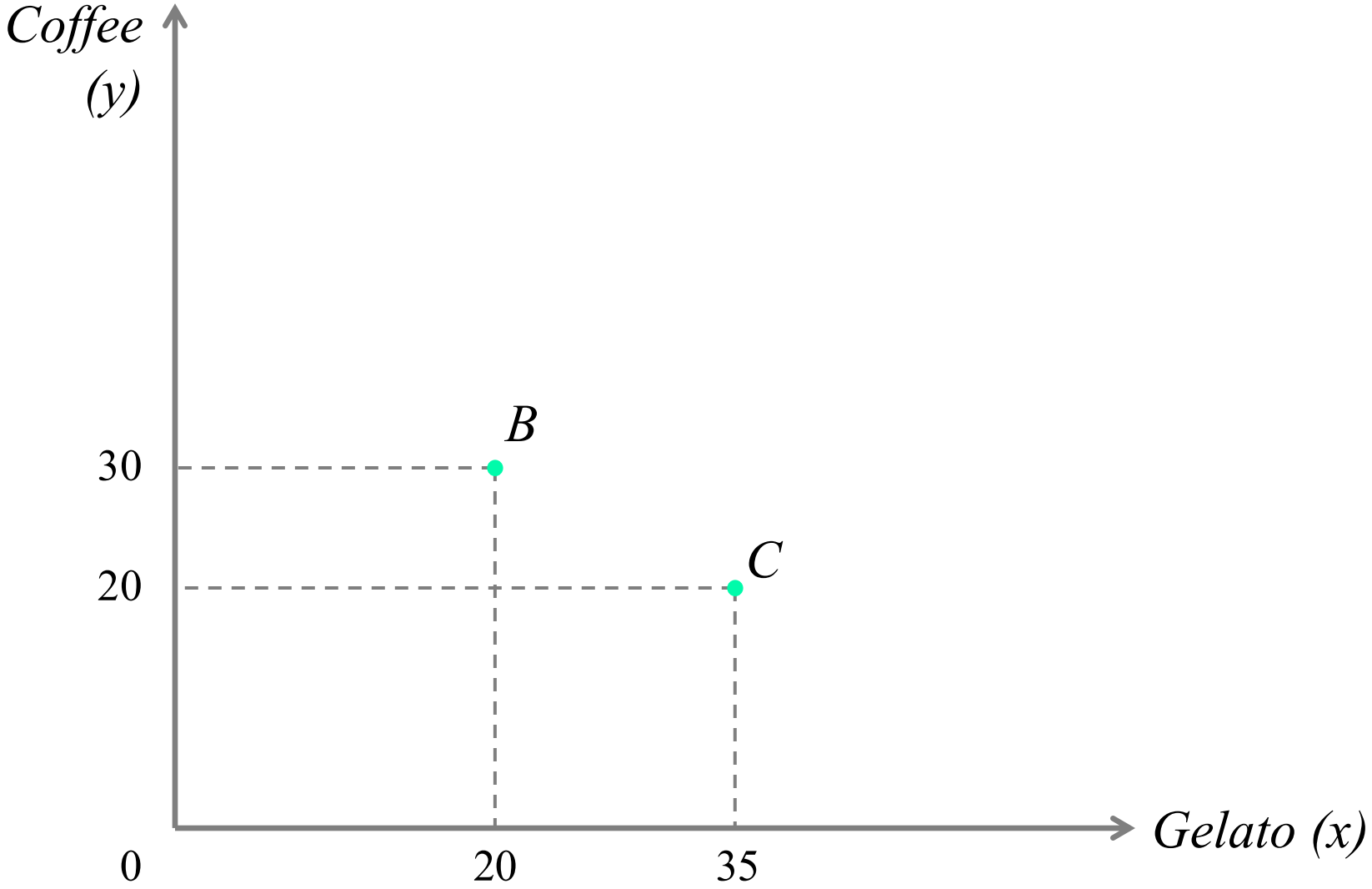
Preferences and Monotonicity



Suppose monotonicity holds for both goods.
How does a consumer rank basket *B* and basket C ?

Exercise 1.5

Preferences and Monotonicity

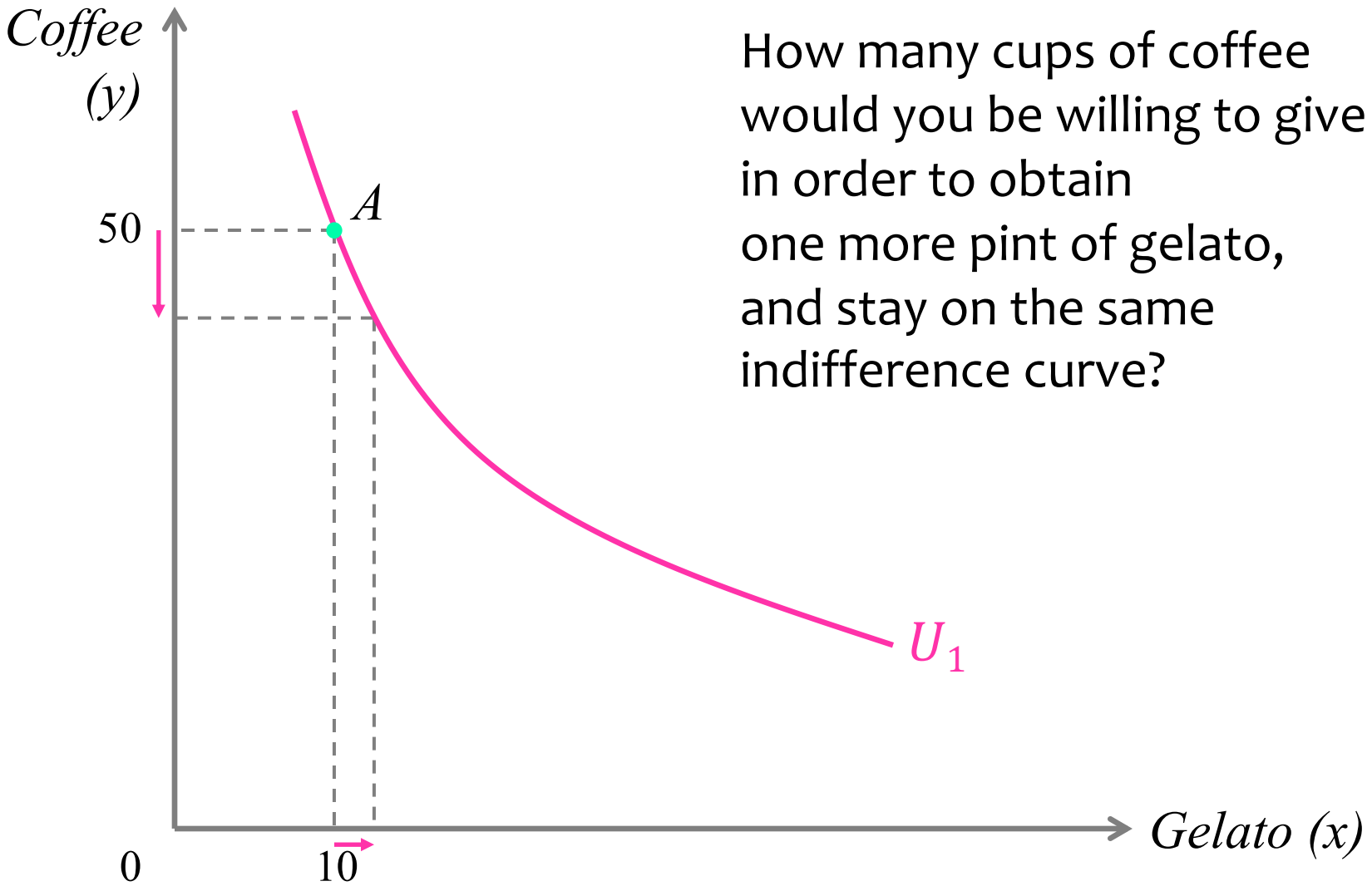


Summary of Assumptions on Preferences

- We always assume
  - Completeness
  - Transitivity
- Monotonicity may be violated.
  - E.g., Serena likes fried chicken and dislikes peanuts.
  - How would you graph Serena's indifference curves?

Marginal Rate of Substitution

Trade-off between Gelato and Coffee



How many cups of coffee would you be willing to give up in order to obtain one more pint of gelato, and stay on the same indifference curve?

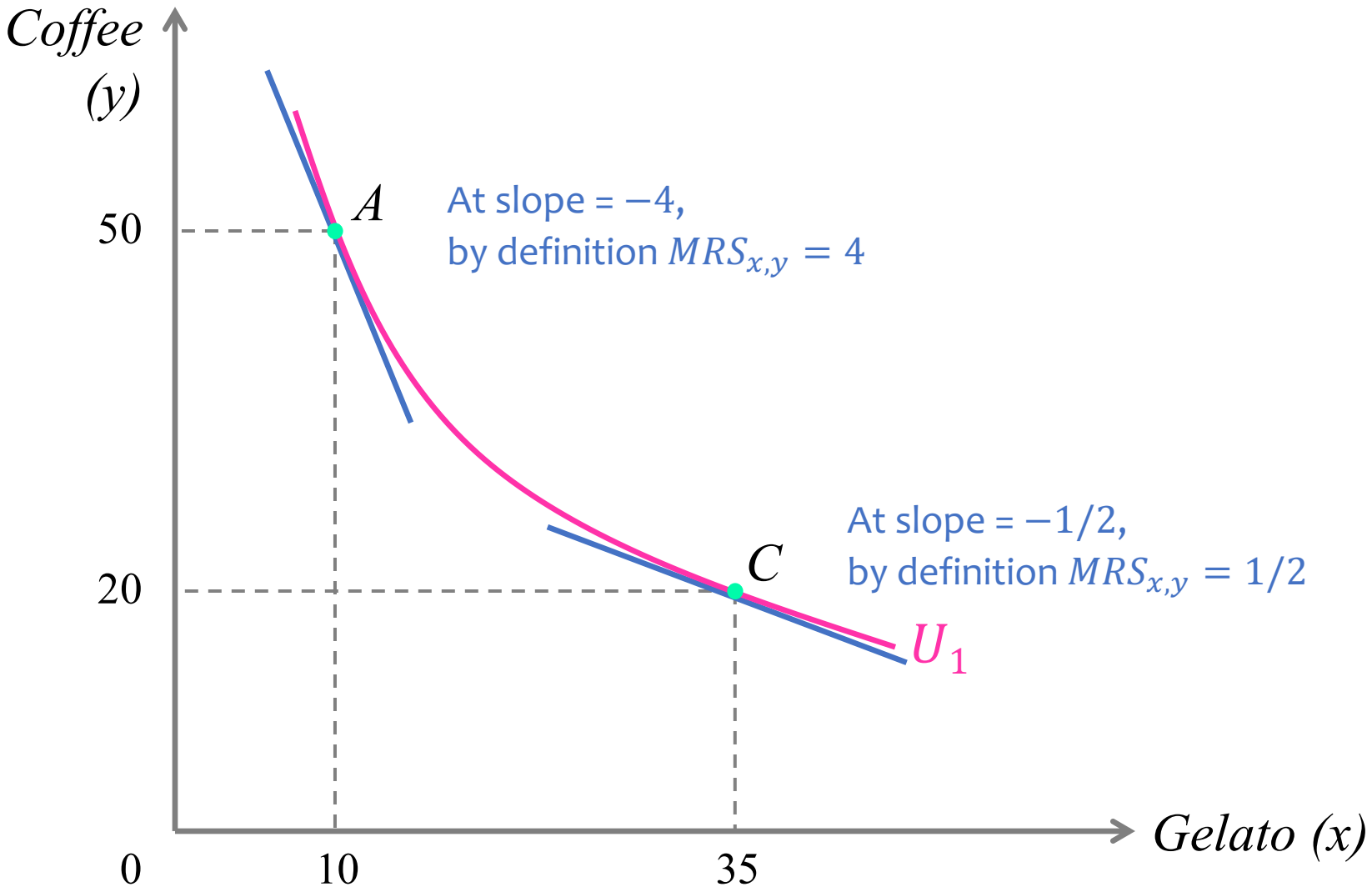
Marginal Rate of Substitution (*MRS*)

- Marginal rate of substitution of x for y:
  - The consumer's valuation of a unit of x, measured in terms of units of y.
  - The rate at which the consumer is willing to give up y in order to get more of x, maintaining the same level of utility.
  - $MRS_{x,y} = -\frac{dy}{dx}\Big|_{same\ U} = -\frac{\Delta y}{\Delta x}\Big|_{same\ U}$

    where Δx is extremely small.

- $MRS_{x,y}$ is the negative of the slope of the indifference curve.

MRS and Slope



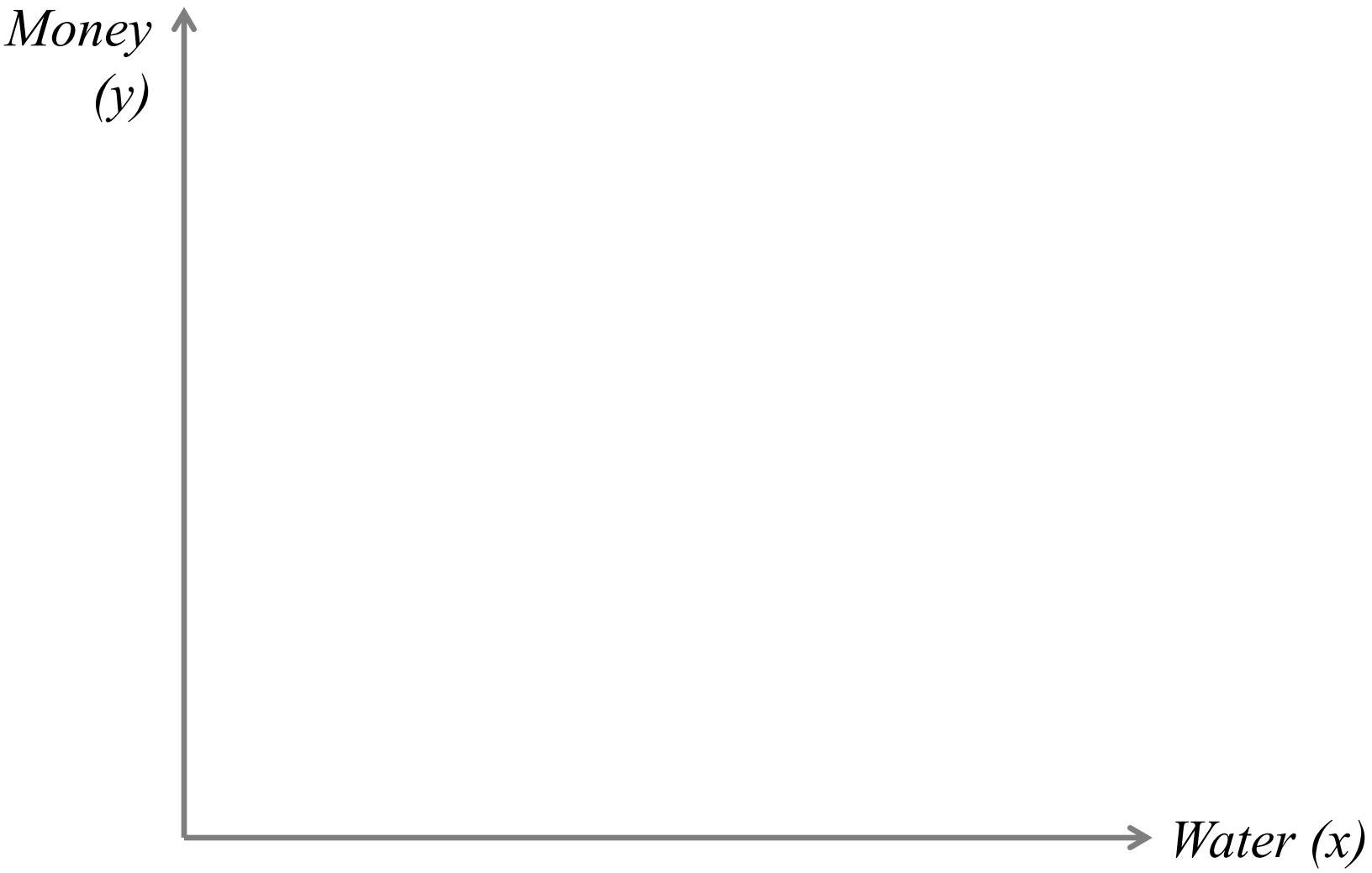
Exercise 1.6

Marginal Rate of Substitution (*MRS*)

- Suppose you are lost in the middle of a desert. You are almost dying of thirst. You have no water (good x), but you have $\$100$ in your pocket (good y).
  - How much would you be willing to pay for your first glass of water?
  - How much would you be willing to pay for your second glass of water (after you have already had a glass of water)?
  - How much would you be willing to pay for your third glass of water (after you have already had two glasses of water)?
- Plot these points to sketch your indifference curve. How does your *MRS* change along your indifference curve?

Exercise 1.6

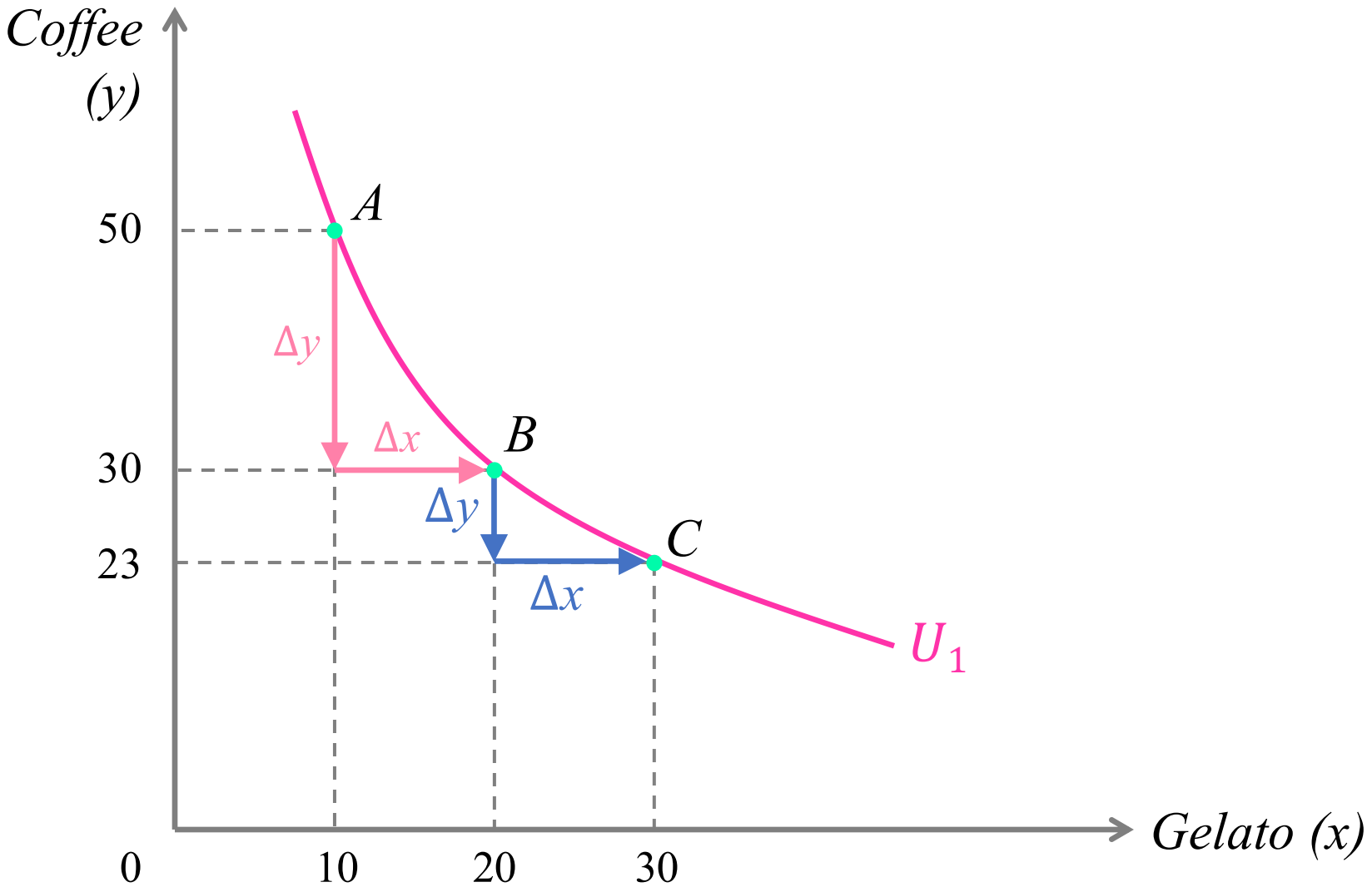
Marginal Rate of Substitution (*MRS*)



Diminishing Marginal Rate of Substitution (*MRS*)

- Diminishing marginal rate of substitution:
  - On an indifference curve,
    $MRS_{x,y}$ decreases
    as the consumer consumes more x and less y.
  - Holding the utility level fixed,
    as the consumer consumes more of x,
    his willingness to give up y
    in exchange for an additional unit of x falls.

Diminishing Marginal Rate of Substitution (*MRS*)

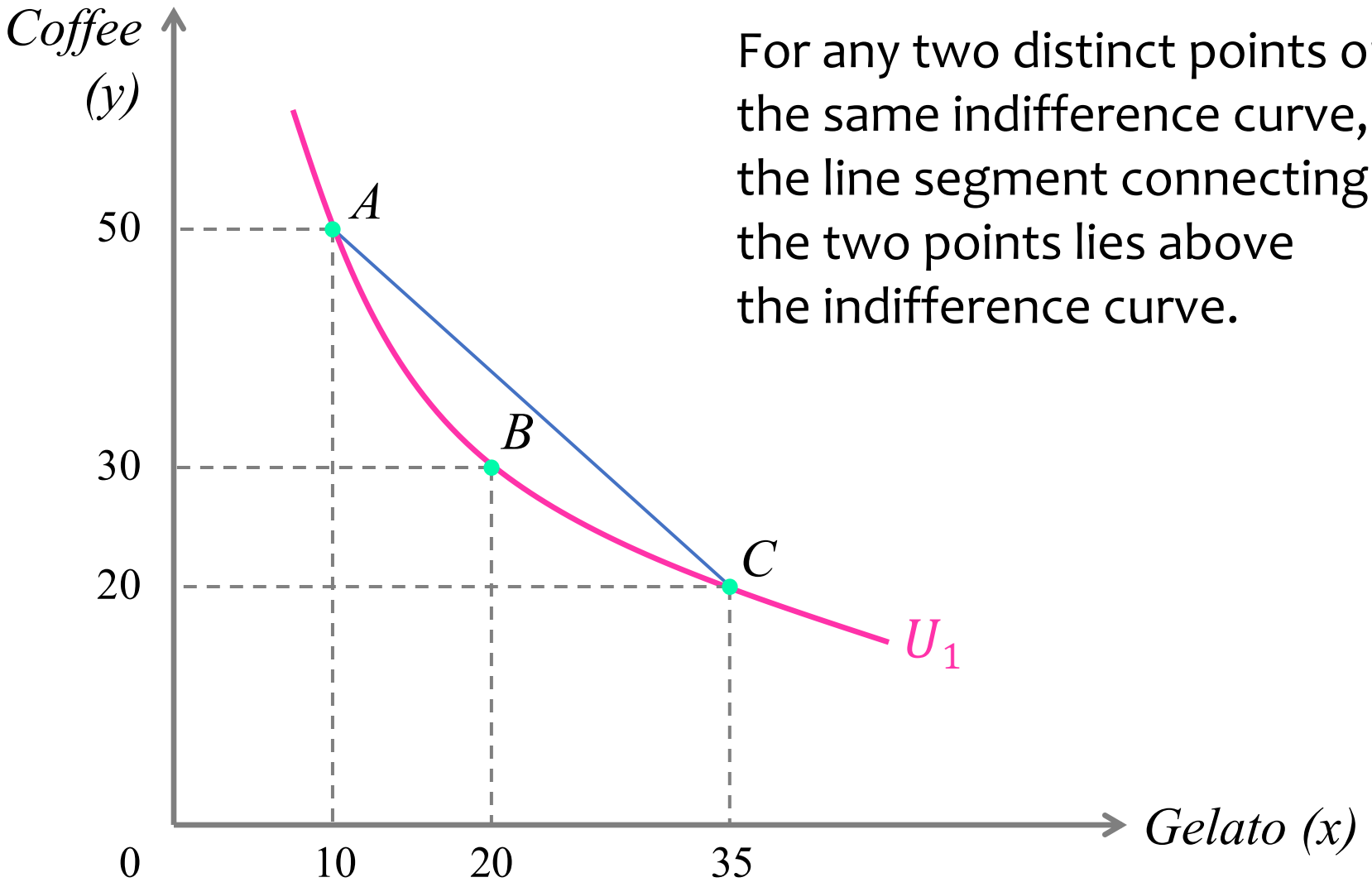


Additional Assumption on Preferences

- If diminishing marginal rate of substitution holds,
  and the three assumptions hold,
  then indifference curves are convex to the origin.

- Convexity
  - Averages are preferred to extremes, e.g.,
    - 2 pints of gelato and 4 cups of coffee is preferred to 0 pints of gelato and 6 cups of coffee.
    - 2 pints of gelato and 4 cups of coffee is preferred to 6 pints of gelato and 0 cups of coffee.

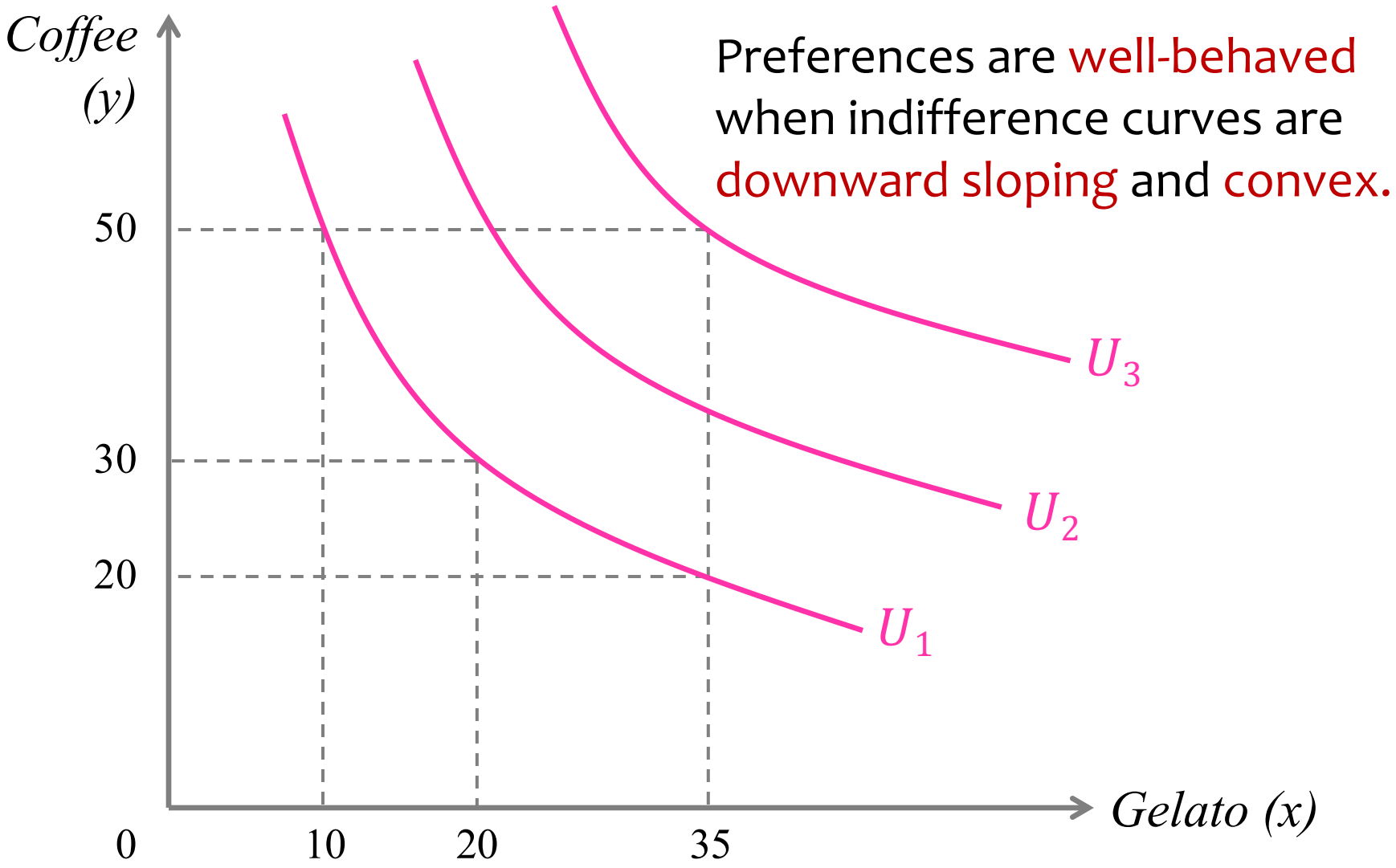
Convexity



For any two distinct points on the same indifference curve, the line segment connecting the two points lies above the indifference curve.

Types of Preferences

Well-behaved Preferences



Preferences are well-behaved when indifference curves are downward sloping and convex.

Exercise 1.7

Special Types of Preferences

For each of the following cases, express Li Na's preferences graphically by drawing indifference curves.

(a) Li Na is equally happy with Coke or Pepsi.

(b) Li Na says: "For every left shoe, I need exactly one right shoe."

Exercise 1.7(a)

Special Types of Preferences

Exercise 1.7(b)

Special Types of Preferences

Application

Properties of Preferences

- For each of the following cases, write down an example of a preference (preferably from your own life) that violates the following properties:
  - Completeness
  - Transitivity
  - Monotonicity
  - Convexity