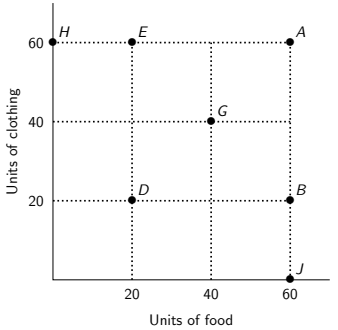
Agenda

1. Where Are We?
2. Consumer Preferences
3. Utility Functions
   - Marginal Utility
   - Indifference Curves
   - Marginal Rate of Substitution
4. Special Utility Curves

Basket of Goods

- **Good** -
- **Basket** -



- **Preferences** -

Assumptions on Preferences

- Three important assumptions that we will make on consumer preferences over goods.
  - **Preferences are Complete** -
  - **Preferences are Transitive** -
  - **More is better** -

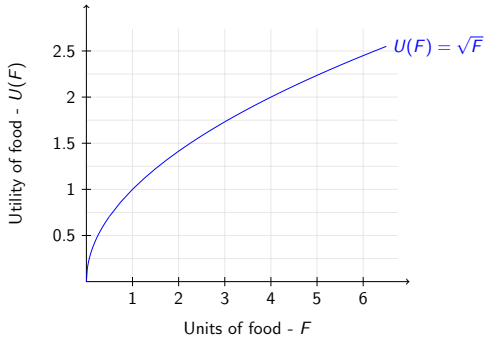
Ordinal vs. Cardinal Ranking

- **Ordinal Ranking** - Ranking that indicates whether a consumer prefers one basket to another, but does not contain _____
- **Cardinal Ranking** - A _____ of the intensity of preference for one basket over another.
- _____ can be inferred from _____, but not vice-versa.

Utility Functions

- If the 3 assumptions are satisfed, then we can represent preferences with utility functions.

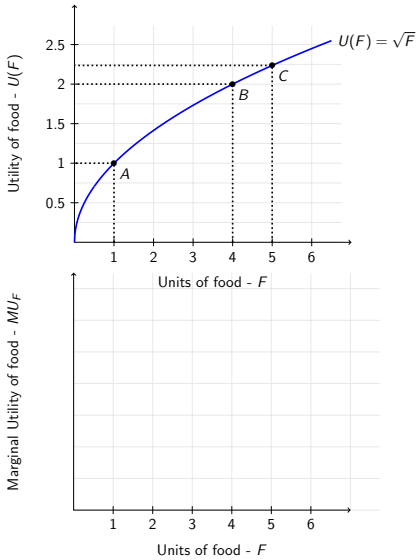
Definition (Utility function)



Marginal Utility

- **Marginal Utility** -

- **Principle of diminishing marginal utility** -

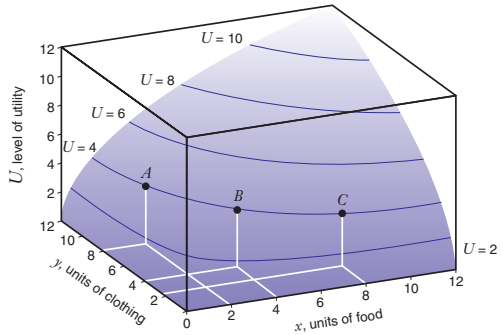


Multiple Goods

- Marginal Utility at basket (x, y),

$MU_x(x, y) =$

$MU_y(x, y) =$



- Example: $U(x, y) = 3xy^2 + x^2$

Exercise

- Suppose $U(x, y) = \sqrt{xy}$, calculate the Marginal utility with regard to x and y at the following points,
- Do we see diminishing marginal utility?

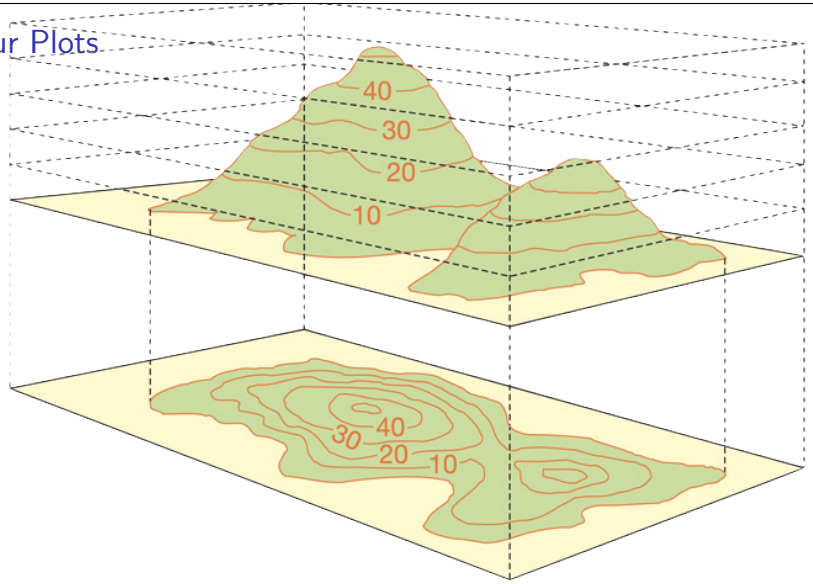
	$(4, 1)$	$(4, 4)$	$(1, 4)$
MU_x			
MU_y			

Exercise

- **Method #1:**

- **Method #2:**

Contour Plots



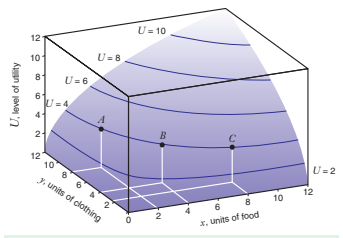
Indifference Curves

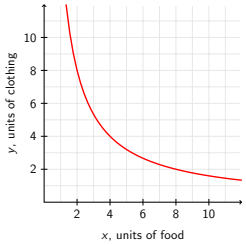
Definition (Indifference Curve)

A curve connecting a set of _____

_____

- Indifference Curves for $U(x, y) = \sqrt{xy}$





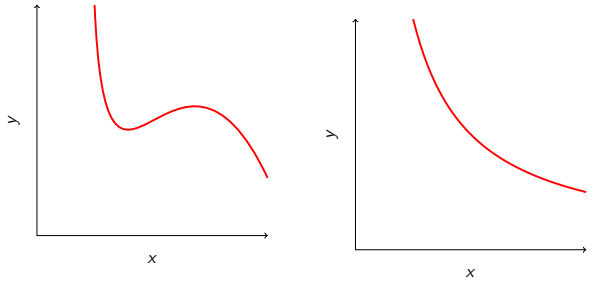
Properties of indifference Curves

- If preferences satisfy the three assumptions, then indifference curves satisfy the following:

1. If consumer likes both goods, indifference curves have _____ slope.
2. Indifference curves cannot _____.
3. Every consumption basket lies on _____
4. Indifference curves are not _____.

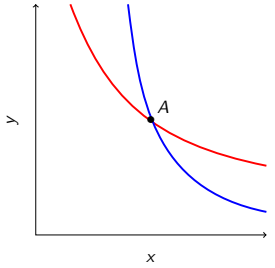
Property #1

- **Property #1:** If consumer likes both goods, indifference curves have negative slope.



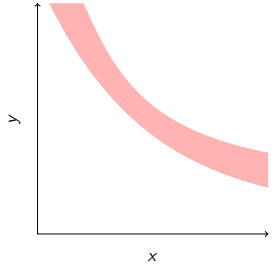
Property #2 and #3

- **Property #2:** Indifference curves cannot intersect.
- **Property #3:** Every Basket lies on only one indifference curve.



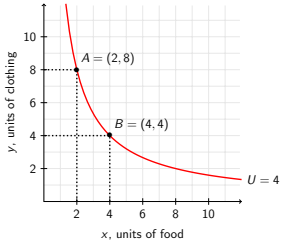
Property #4

- **Property #4:** Indifference curves are not "thick".



Marginal Rate of Substitution

Definition (Marginal Rate of Substitution)



Marginal Rate of Substitution

- The change in utility from (x, y) to (x', y') can be written as,

$$\Delta U \approx$$

- To move along IC, utility must be _____.

- Rearranging,

- So $MRS_{x,y}$ is the _____ of IC at point (x, y).

Diminishing Marginal Rate of Substitution

- **Diminishing Marginal Rate of Substition** - A feature of consumer preferences for which the marginal rate of substitution of one good for another good

_____

_____

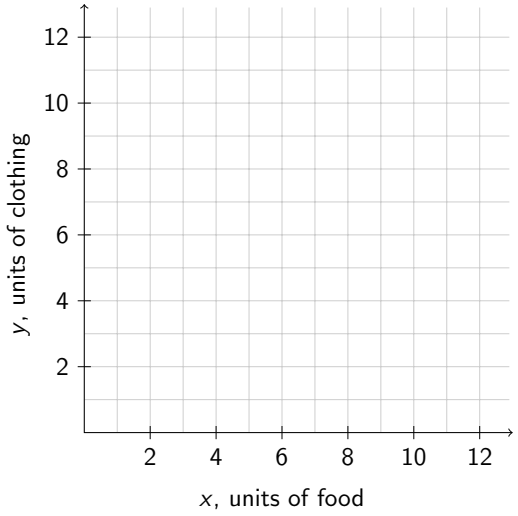
- Example:

Unit of Clothing	**Units of Food**	$MRS_{x,y}$

  - If you have 16 units of clothing and 1 unit of food,

Exercise

- For $U(x, y)$, plot the indifference curve, $U(x, y) = 12$.
- Calculate the $MRS_{x,y}$ at x values 1,3,6,12 on $U(x, y) = 12$.
- Does $U(x, y)$ exhibit diminishing $MRS_{x,y}$?



Exercise

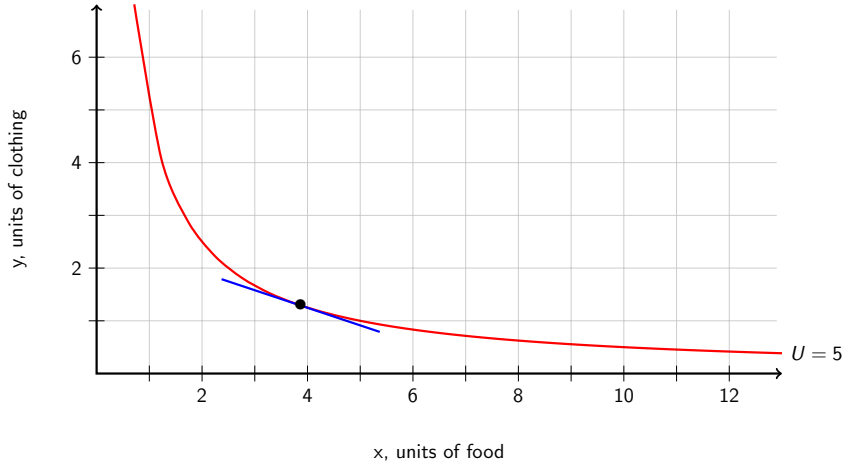
- **Method #1:**

- **Method #2:**

Example

- Let $U(x, y) = xy$
- For each utility level, $U = \{5, 10, 15, 20, \ldots, 45\}$, find a point on the indifference curve where the MRS is $\frac{1}{3}$.
- On the $U = 5$ indifference curve, $xy = 5$,

Example

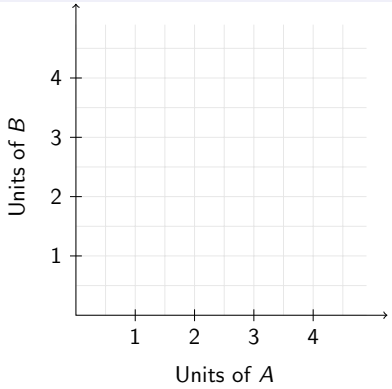


- For this utility function, whenever _____.

Perfect Substitutes

Definition (Perfect Substitutes)

Two goods such that the marginal rate of substitution of one good for the other is _____

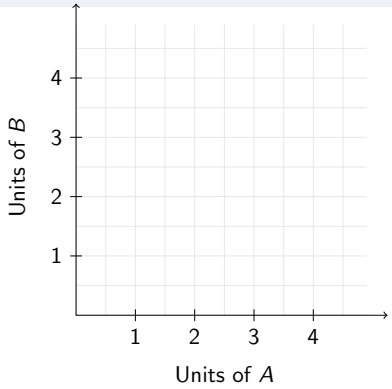


- Examples:

Perfect Complements

Definition (Perfect Complements)

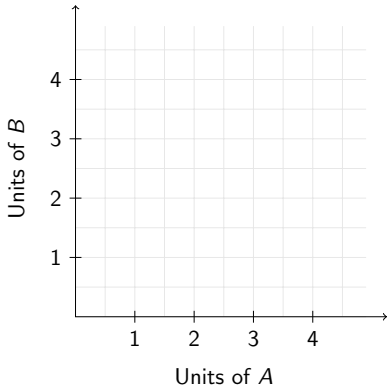
Two goods that the consumer always wants to consume _____.



- Examples:

Cobb-Douglas Utility

Definition (Cobb-Douglas Utility Function)



- Properties:

Quasi-Linear Utility

Definition (Quasi-Linear Utility Function)