



CONSUMER BEHAVIOR: DERIVING THE MARGINAL RATE OF SUBSTITUTION



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MRS



- The **Marginal Rate of Substitution** is the maximum amount of one good a consumer is willing to give up to obtain one more unit of another good.
- Example: an $MRS = -3$ means that a consumer is willing to give up three units of good y to get one more unit of good x
- The **MRS** is the slope of the indifference curve



THE CALCULUS OF MRS



- **Review – total differential**
- $U(x, y) = f(x, y)$
- $\Delta U(x, y) =$

- **Example – Uber Fare**
- $F(d, t) = f(d, t)$
- $\Delta f(d, t) =$



THE CALCULUS OF MRS



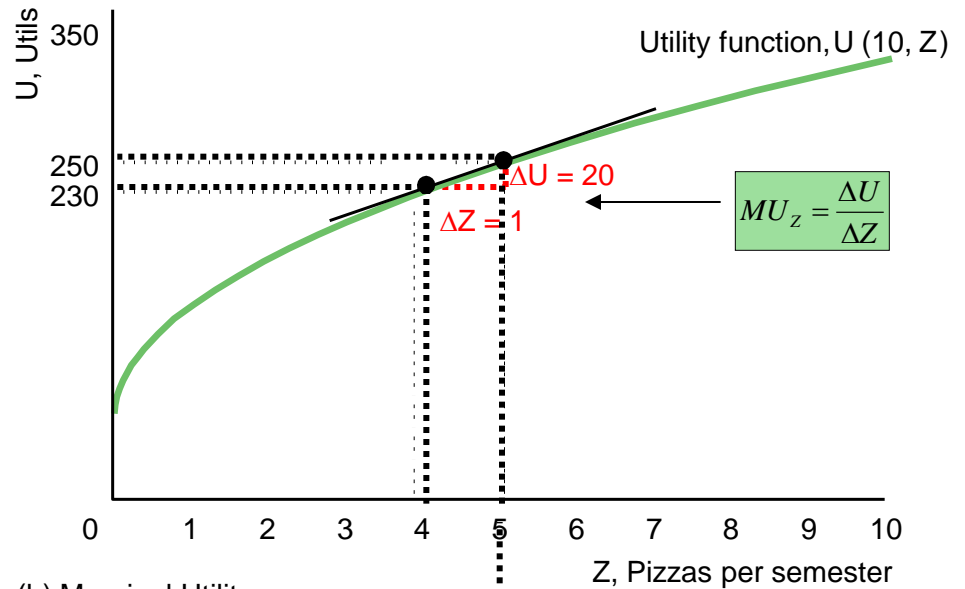
- Indifference Curve: $U(x, y) = f(x, y)$

$$\Delta U(x, y) =$$

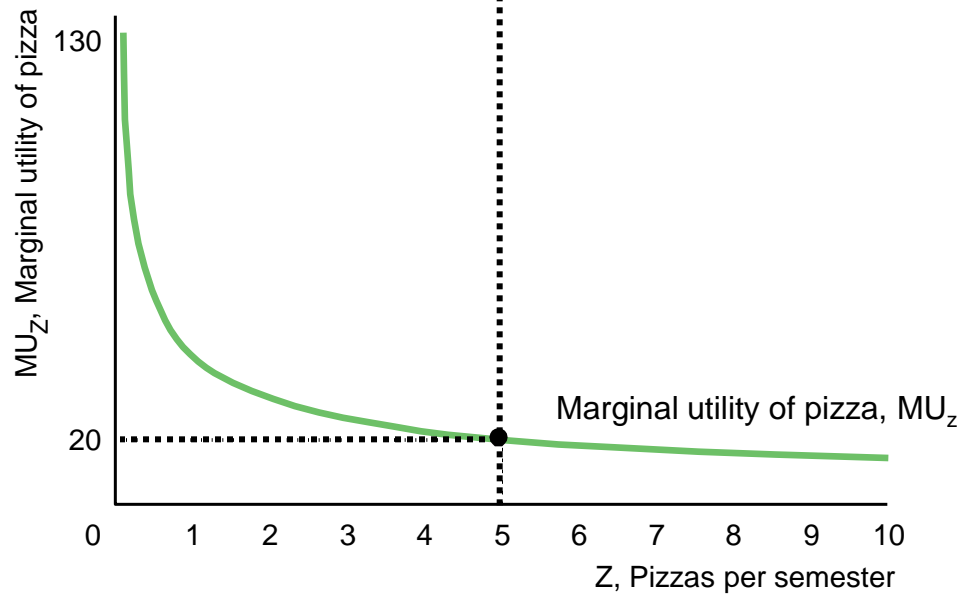


• Diminishing MRS

(a) Utility



(b) Marginal Utility

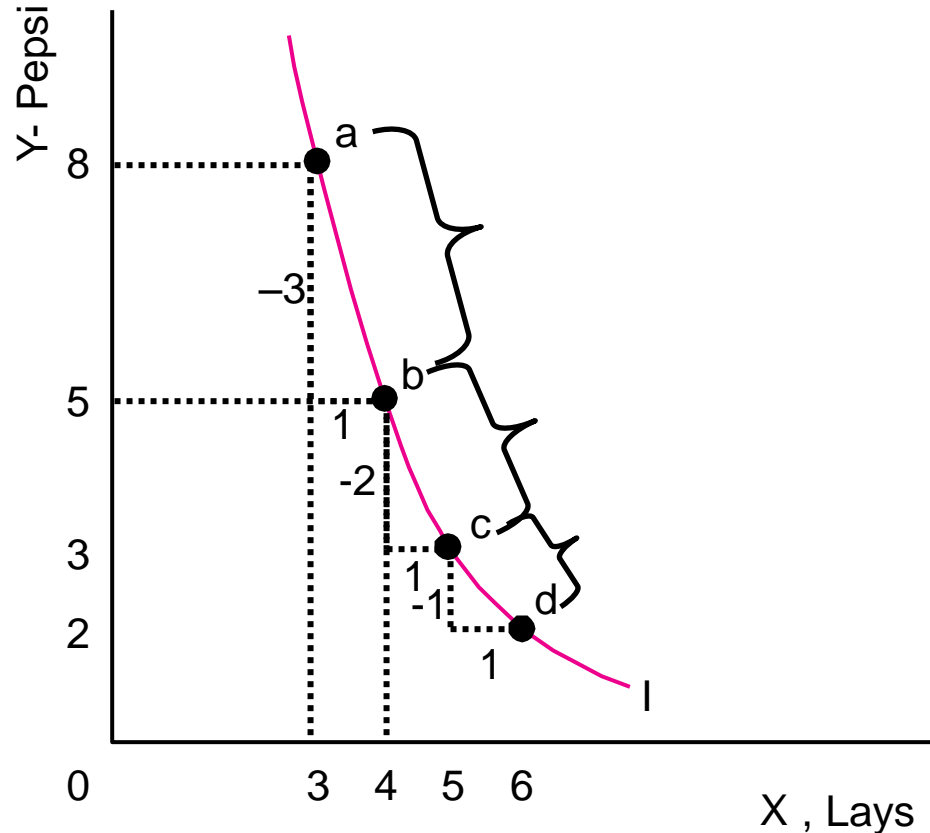




DIMINISHING MRS



- As a consumption of x increases, MRS decreases.
- A decreasing MRS makes the indifference curve convex.
- Question: as x increases, why does the MRS decrease? because of *diminishing marginal utility* – so as long as $MU_x \downarrow$ our $MRS \downarrow$
- Diminishing MRS gives our indifference curves the **convex** shape that we have.
- Most indifference curves are convex – but there are some exceptions.

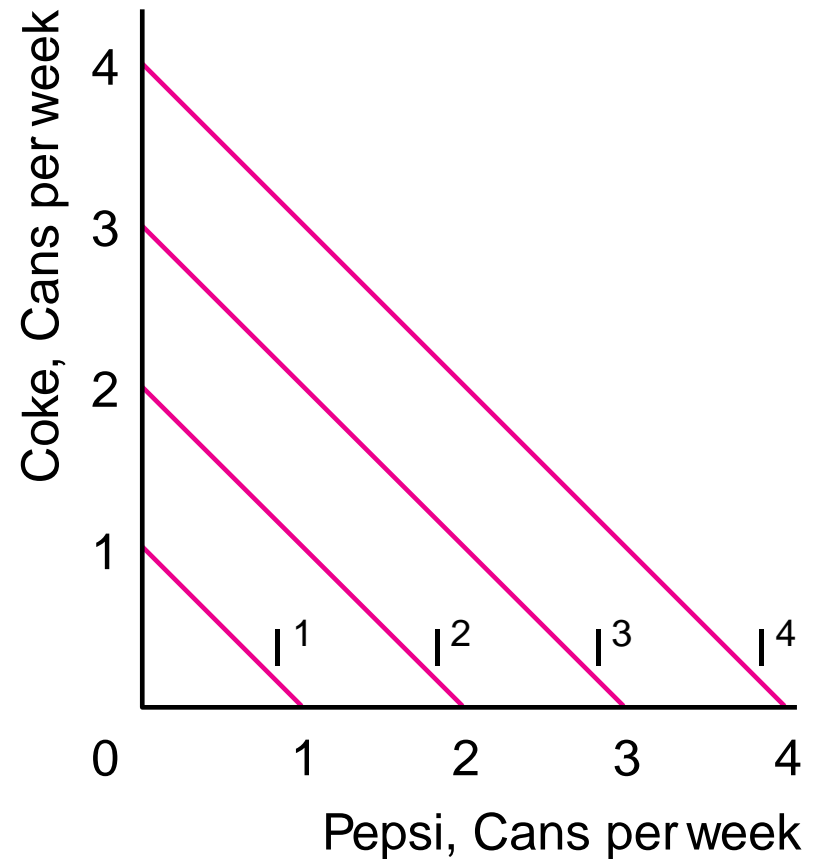




PERFECT SUBSTITUTES



- What is the MRS of these preferences?
- $MRS = -1$ (from the graph)
- MRS is constant, not diminishing.
- Recall the definition of MRS – the rate at which you give up Coke for one more Pepsi is not going to change because you think these goods are **perfect** substitutes.
- Mathematical form:

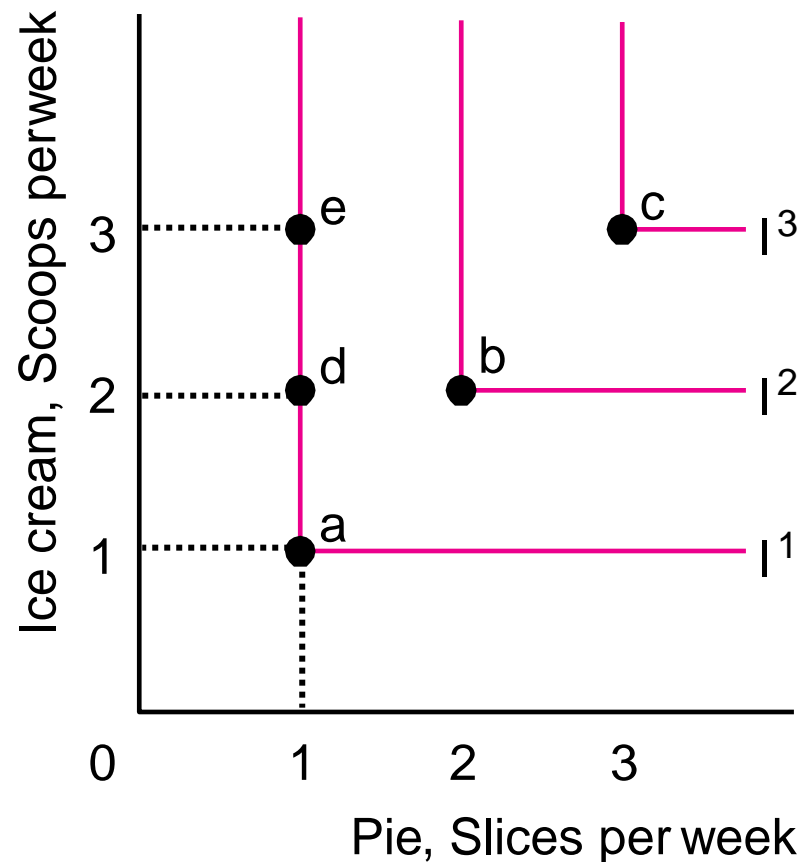




PERFECT COMPLEMENTS



- What is the MRS of these preferences?
- MRS = undefined
- IC is not a continuous function – it has a kink – so no derivative.
- Vertical portion has infinite slope, horizontal portion has zero slope.
- Special case: goods that are consumed in an **exact proportion**
- Important clarification: does not have to be 1-for-1
- Mathematical form:

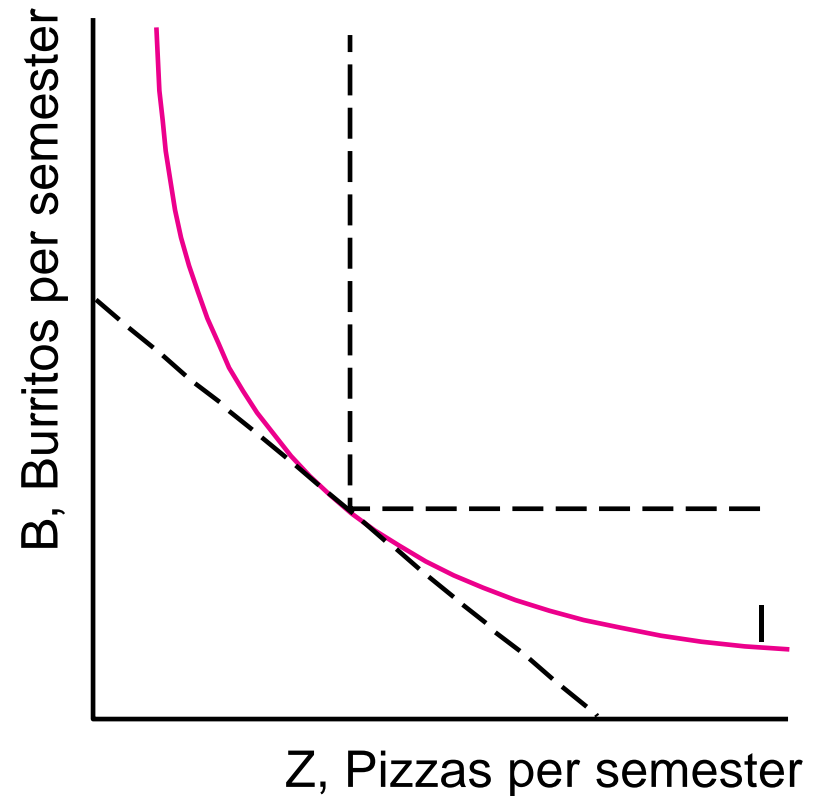




IMPERFECT SUBSTITUTES



- The standard-shaped, convex indifference curve in the panel lies between these two extreme examples.
- Convex indifference curves show that a consumer views two goods as imperfect substitutes.
- Mathematical form:

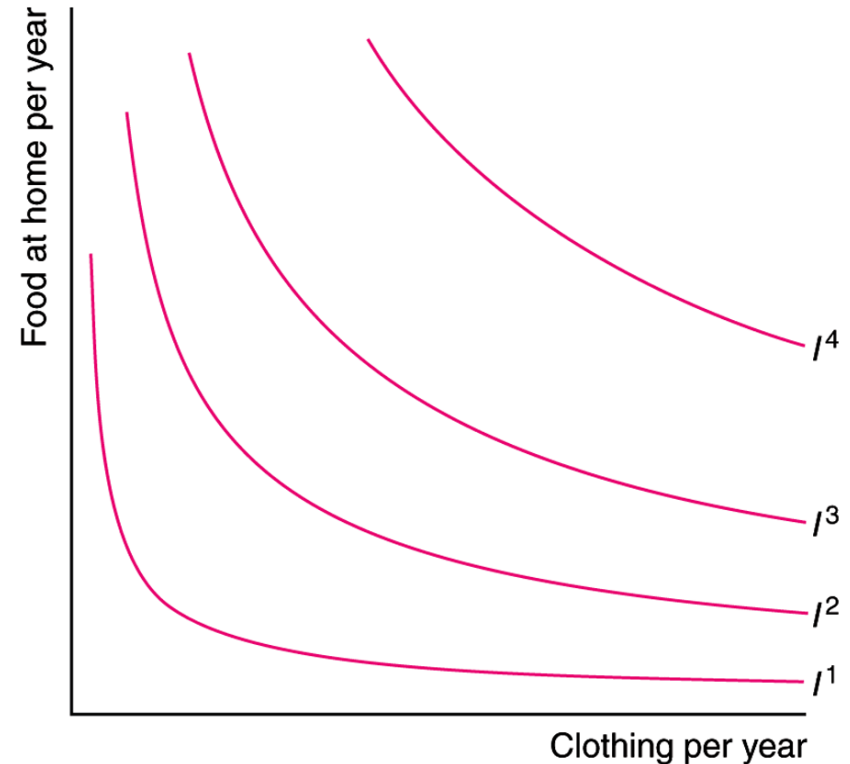




CHANGING PREFERENCES



- Food and clothing are perfect complements when the consumer has little of either good.
- Both are required for life so consumer cannot trade one good for the other if it means having less than the critical levels.
- And perfect substitutes when the consumer has large quantities of both goods.

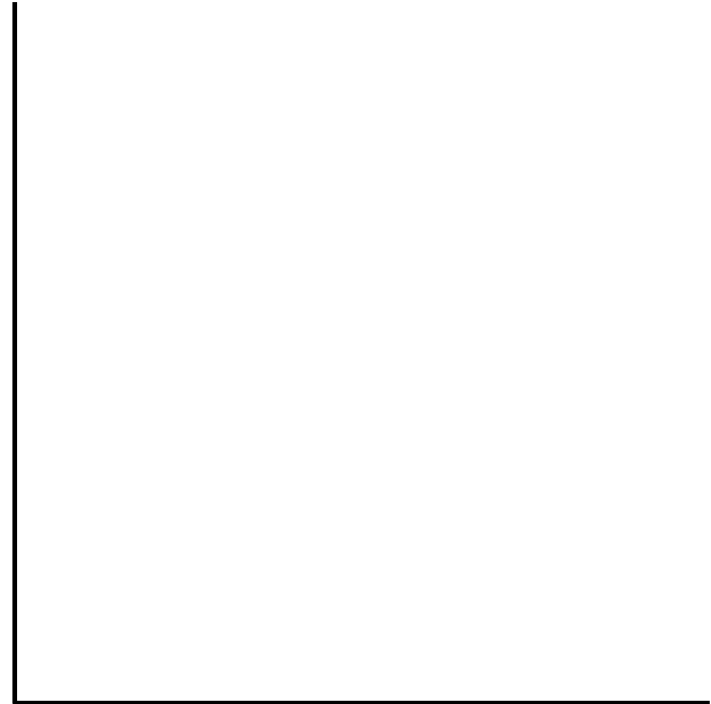




OTHER PREFERENCES



- Quasilinear
- Constant Elasticity of Substitution
- Imperfect Complements
- Concave





THANK YOU!



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