

For perfect complements, simply set the inside of the min function equal to itself, and substitute into the budget constraint.

For perfect substitutes, concave, and max utility functions, the consumer will choose all of one good and none of the other.

- *For perfect substitutes functions:*  
Compare the MRS to the price ratio
- *For concave functions:*  
Compare utility levels at the extremes
- *For max functions:*  
Compare utility levels at the extremes

The following exercises relate to these three types of utility functions.

## RECREATION, LABOR, AND CONSUMPTION

I. Perfect Substitutes only:

If  $MRS > \frac{3}{P}$  → choose all R

If  $MRS < \frac{3}{P}$  → choose all L/C

II. Demand functions (applies to all three types of utility)

Using the variables  $w$ ,  $L(\bar{L})$ , and  $M$  write the general demand functions for each of the following cases. Use the budget constraint for Leisure and Income,

$wR + PC = M + wL$ , to help solve for your answers.

1. If all Recreation:

(Hint: what is the maximum amount of recreation you can have? What are the minimum amounts of consumption and labor you can have?)

$$R^* = \bar{L}$$

$$C^* = \frac{M}{P}$$

$$L^* = 0$$

$$wR + PC = M + wL$$

$$w\bar{L} + PC = M + w\bar{L}$$

$$PC = M$$

$$C = \frac{M}{P}$$

2. If all Labor/Consumption:

(Hint: what is the minimum amount of recreation you can have? What are the maximum amounts of consumption and labor you can have?)

$$R^* = 0$$

$$C^* = \frac{M + w\bar{L}}{P}$$

$$L^* = \bar{L}$$

$$wR + PC = M + wL$$

$$w(0) + PC = M + w\bar{L}$$

$$PC = M + w\bar{L}$$

$$C = \frac{M + w\bar{L}}{P}$$

## PRESENT AND FUTURE CONSUMPTION

I. Perfect Substitutes only:

If  $MRS > (1+p)$  → choose all  $C_1$

If  $MRS < (1+p)$  → choose all  $C_2$

II. Demand functions (applies to all three types of utility)

Using the variables  $r$ ,  $\Pi$ ,  $m_1$ , and  $m_2$  write the general demand functions for each of the following cases. Use the budget constraint for Present and Future consumption,

$(1+p)C_1 + C_2 = (1+p)m_1 + m_2$ , to help solve for your answers.

1. If all Present Consumption:

(Hint: what is the maximum amount of present consumption you can have? What is the minimum amount of future consumption you can have?)

$$c_1^* = \frac{(1+p)m_1 + m_2}{1+p}$$

$$c_2^* = 0$$

$$(1+p)c_1 + 0 = (1+p)m_1 + m_2$$

$$c_1 = \frac{(1+p)m_1 + m_2}{1+p}$$

2. If all Future Consumption:

(Hint: what is the minimum amount of present consumption you can have? What is the maximum amount of future consumption you can have?)

$$c_1^* = 0$$

$$c_2^* = (1+p)m_1 + m_2$$

$$(1+p)(0) + c_2 = (1+p)m_1 + m_2$$

$$c_2 = (1+p)m_1 + m_2$$