

## Day 2: Budget constraints & constrained optimization

### 4.3 The consumer's income and the budget constraint

- Obviously people don't have  
infinite \$ and things aren't free

#### Simplifying Assumptions

- each good has a fixed price,  
people can buy as much as they  
can afford
- Consumer has a fixed amount of  
income to spend
- Consumers can't borrow or save

# Budget Constraint

$$\text{Cost} = P_x Q_x + P_y Q_y$$

If  $\text{Cost} \leq \text{Income}$

then the bundle  $(Q_x, Q_y)$   
is feasible

If  $\text{Cost} > \text{Income}$

then the bundle  $(Q_x, Q_y)$   
is infeasible

## Slope of the Budget Constraint

$$\text{Cost} = P_x Q_x + P_y Q_y$$

$$P_y Q_y = \text{Cost} - P_x Q_x$$

$$Q_y = \frac{\text{Cost}}{P_y} - \frac{P_x}{P_y} Q_x$$

$$y = \frac{\text{Cost}}{P_y} - \frac{P_x}{P_y} X$$

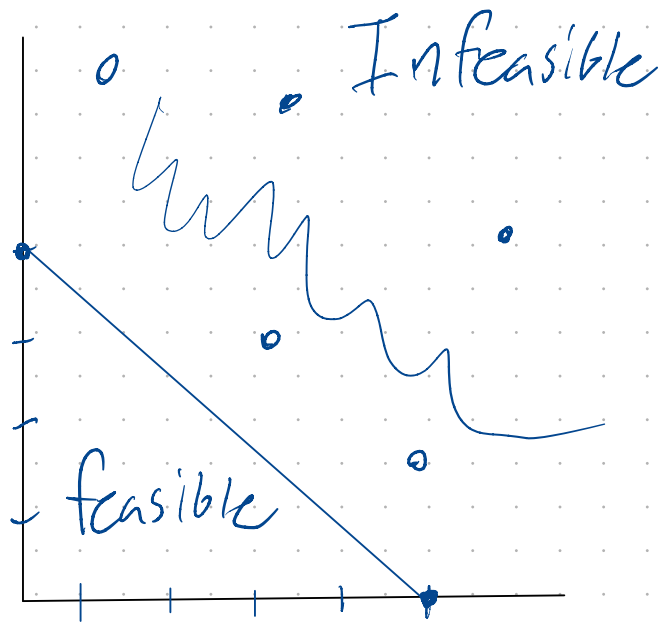
$\underbrace{\hspace{1.5cm}}_{\downarrow}$  y intercept       $\underbrace{\hspace{1.5cm}}_{\downarrow}$  Slope

ex:

Income = \$20

Cost of X = \$4

Cost of Y = \$5



# Factors that affect the budget constraint

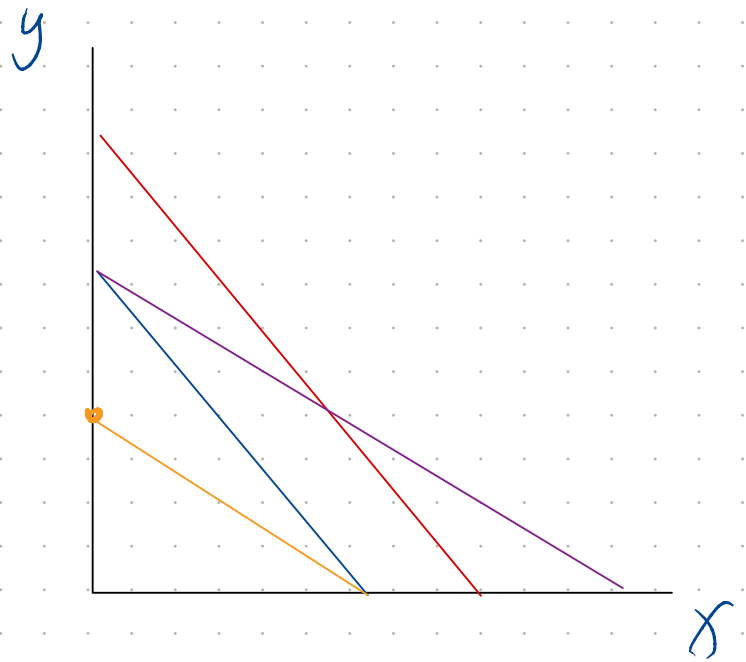
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- $P_x$
- $P_y$
- Income

If  $P_y \uparrow$

If Income  $\uparrow$

If  $P_x \downarrow$



# Kinked budget constraints

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- quantity discounts
- quantity limits

