# **ECONOMICS 8100**

### GREG LEO

### Part 1. Budget

### 1. Consumption Set X

**Assumptions:** (Universe of Choice Objects): X

**Bundles:** Elements of X.  $x \in X$ 

# Assumptions about X.

- 1.  $\emptyset \neq X \subseteq \mathbb{R}^n_+$ .
- 2. X is closed.
- 3. X is convex.
- 4.  $0 \in X$ .

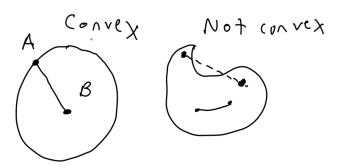


FIGURE 1.1. Examples of a Convex/Non-Convex Set.

# 2. Budget Set B

# Budget Set: $B \subseteq X$

X defines the scope of the model. B is what an  $individual\ consumer\ chooses\ among.$ 

**Example.** Budget Set with Prices and Income

$$B = \{x | x \in X \& x_1 p_1 + x_2 p_2 \le m\}$$

### Example. Ice Cream Bowls

Every ice cream bowl x has some non-negative number of scoops of Vanilla, Chocolate, Strawberry.

$$X = \mathbb{R}^3_+$$

Budget B is the set of bowls with no more than one scoop of ice cream.

$$B = \left\{ x | x \in R_+^3 \& \sum_{i=1}^3 x_i \le 1 \right\}$$

This is the unit-simplex in  $\mathbb{R}_3$ .

 $(1,0,0) \in B$ . (On the boundary.)

 $(0.5, 0.5, 0) \in B$ . (On the boundary.)

 $(0.25, 0.25, 0.25) \in B$ . (In the interior.)

 $(2,0,0) \notin B$