Choice.

Objects and Sets.

X "Choice Set" (Universe of Choice Objects)

x choice objects, objects, bundles

The choice set is all the choice objects that might be relevant for your model.

$X = \{\text{scoop of vanilla, scoop of chocole, scoop of strawberry}\}$

$X =$ Every bowl of ice cream with any amount of scoops of vanilla chocolate or strawberry.

$(1, 0, 0)$ one scoop of vanilla

$(0, 1, 0)$ one scoop of chocolate

$(1, 1, 1)$ one scoop of each

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

$(0, 0, 0) \in X$

x is a bundle. $x \in X$ if the bundle is in the choice set.

$X = \left\{x | x \in \mathbb{R}^3_+ \,\&\, x \neq (0, 0, 0)\right\} = \mathbb{R}^3_{++}$

All bowls of ice cream with no more than one total scoop of the three flavors.

$X = \left\{x | x = (x_1, x_2, x_3) \,\&\, x_i \geq 0 \,\&\, \sum_{i=1}^3 x_i \leq 1\right\}$

All bowls of ice cream where each flavor has zero or an odd number of scoops.

$X = \left\{x | x = \mathbb{R}^3_+ \,\&\, \forall i \in \{1, 2, 3\}, \left(\exists n \in \left\{\tfrac{1}{2} \bigcup \mathbb{N}\right\} : x_i = 2n - 1\right)\right\}$

Let $\mathbb{O}$ be the odd integers including zero.

$$X = \left\{x | x = \mathbb{R}^3_+ \,\&\, \forall i \in \{1, 2, 3\}, x_i \in \mathbb{O}\right\}$$

Budget set B is the set of choice objects actually available to a decision maker at some point in the model.

$B \subseteq X$

$X = \left\{x | x = (x_1, x_2, x_3) \,\&\, x_i \geq 0 \,\&\, \sum_{i=1}^3 x_i \leq 1\right\}$

Finn's budget set when we go to Jeni's. Finn can have up to one scoop of ice cream.

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

$B = \left\{x | x \in X \,\&\, x_i \geq 0 \,\&\, \sum_{i=1}^3 x_i \leq 1\right\}$

For Dad, the budget set is all bowls that cost less than \$15. A scoop of ice cream is \$5. This is a "competitive budget set".

$B = \{x | x \in X \,\&\, 5x_1 + 5x_2 + 5x_3 \leq 15\}$

Suppose p_1, p_2, p_3 and my income or amount of money to spend is m. The bundle you buy has to be affordable (and adorable).

$B = \{x | x \in X \,\&\, \sum_{i=1}^n p_i x_i \leq m\}$