Means "Dad" and Lizzy are part of the set "A":
$A = \{\text{Dad}, \text{Lizzy}\}$

Means "E" is an empty set
$E = \{\}$ or $E = \emptyset$

Means "contains all members of group under consideration"
$\Omega = \{\text{Everything}\}$
$\cup = \{\text{Everything}\}$

Is a member of
$\text{Lizzy} \in F$

Is not a member of
$\text{TJ} \notin F$

Subsets
$X \subseteq Y$

- means x is a subset of y
- every member of x is also a member of y
- not necessarily reversible
- could be true <u>even</u> if $x = y$

$X \subset Y$

- same as above, but <u>false</u> if $x = y$
- called **proper subset**

Defining set extensionally
$P = \{\text{Dad}, \text{Mom}\}$

Defining set intensionally
Let P be the set of all parents

- Two sets are equal if they have the same <u>extension</u>, doesn't have to have the same intension

Intensional definition with bracket notation
$M = \{k : k \text{ is between 1 and 20, and a multiple of 3}\}$

- Intensionally defining set, M is the set of numbers k such that k is between 1 and 20, and a multiple of 3

Infinite Set
$I = \{3, 6, 9, 12, ...\}$

Cardinality
<u>cardinality</u>: size of set
$|\emptyset| = 0$
$|\{\emptyset\}| = 1$

Set Operators

<u>Union</u>: OR

$A = \{\text{Dad, Lizzy}\}$

$B = \{\text{Lizzy, TJ, Tommy}\}$

$A \cup B = \{\text{Dad, Lizzy, TJ, Tommy}\}$

<u>Intersection</u>: AND

$A = \{\text{Dad, Lizzy}\}$

$B = \{\text{Lizzy, TJ, Tommy}\}$

$A \cap B = \{\text{Lizzy}\}$

<u>Partial complement</u>

- $A - B$ contains elements in A that are <u>not</u> in B

<u>Total complement</u>

$\overline{B} = \Omega - B$

- Means all the things that aren't in B

<u>Cartesian product</u>

$A = \{\text{Bob, Dave}\}$

$B = \{\text{Jenny, Gabbie, Tiff}\}$

$A \times B = \{(\text{Bob, Jenny}), (\text{Bob, Gabbie}), (\text{Bob, Tiff}), (\text{Dave, Jenny}), (\text{Dave, Gabbie}), (\text{Dave, Tiff})\}$

De Morgan Laws

$\overline{X \cap Y} = \overline{X} \cup \overline{Y}$

Power Set

- <u>Power set</u>: the set of all subsets of that other set
- every item, every combination, and no items

$A = \{\text{Dad, Lizzy}\}$

$\mathbb{P}(A) = \{\{\text{Dad, Lizzy}\}, \{\text{Dad}\}, \{\text{Lizzy}\}, \emptyset\}$

Partition

- A group of subsets that contain everything in the original set collectively, and share no duplicates between subsets