

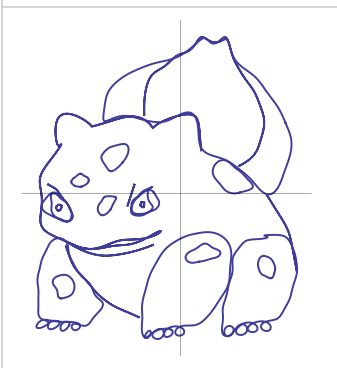
MATH:1260 Pokémath

The Mathematics of Pokémon Go[®]

Week 2 Monday, Spring 24

Popular curve:

Bulbasaur-like curve



Plan for Today

- Syllabus Questions
 - Attendance Policy (Top Hat)
 - Check ICON for details!
- More about Sets

Class Reminders

- Textbook is fixed! Can you access Top Hat?
- GW2 in discussion Thursday
- HW1 is due Wednesday (at 11:59 PM)
 - Late Work Policy

Game Reminders

- My trainer code: 2961 3846 8580
- There's a place for you to share your codes on ICON!

Relationships Between Sets

Definition: Equality

Two sets, A and B , are **equal** if they have the same elements

Notation

$$A = B$$

Definition: Subsets

A is a **subset of** B , if all of the elements of A are elements of B .

Notation

$$A \subseteq B$$

Definition: Proper Subsets

A is a **proper subset of** B , if all of the elements of A are elements of B and there are elements of B that are not elements of A .

Notation

$$A \subset B$$

Some Special Sets

Definition: Empty Set

The **empty set** is the set with no elements

Notation

\emptyset

Definition: Universal Set

The **universal set** is the set of all objects of the type being discussed.

Notation

\mathcal{U}

Some Starter Pokémon: Visualizing Equal, Subset, and Proper Subset

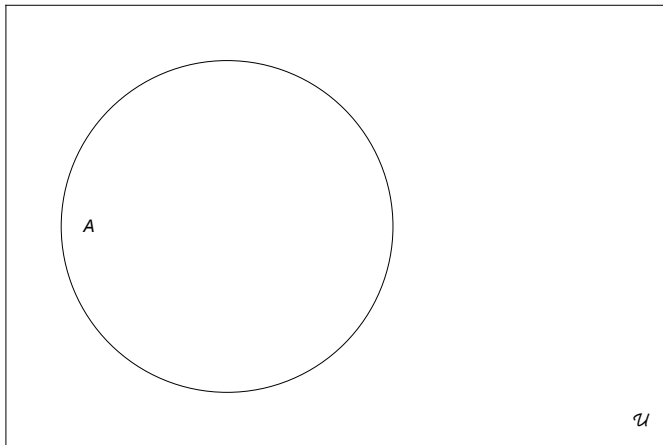
 Chikorita Grass	 Cyndaquil Fire	 Totodile Water
 Treecko Grass	 Torchic Fire	 Mudkip Water
 Turtwig Grass	 Chimchar Fire	 Piplup Water
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Set Notation Mistakes to Avoid

Venn Diagrams

A diagram that shows the relationship between sets.

Typically the universal set is a large rectangle and sets within that universal set are circles.



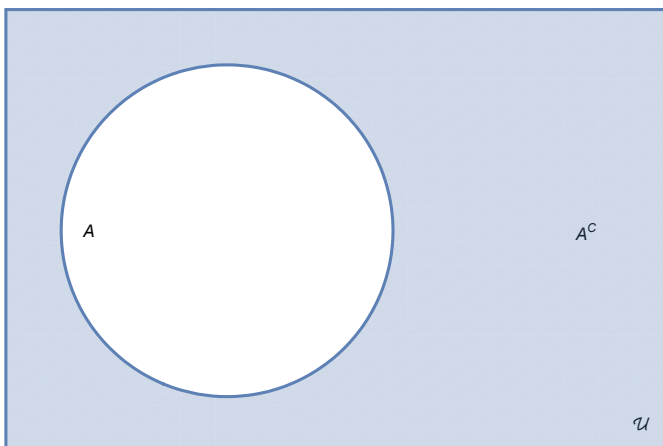
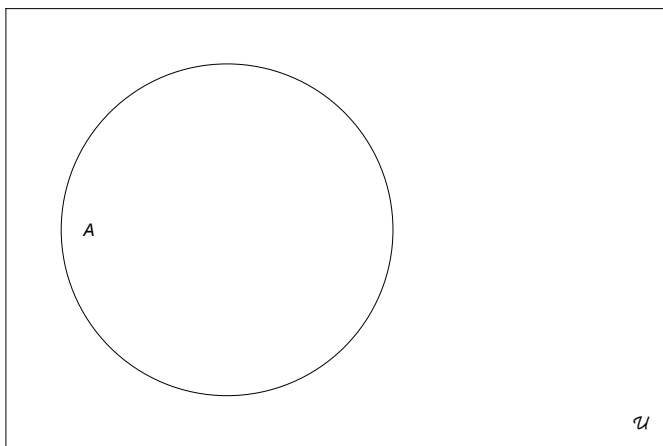
Complements

Definition

The **complement** of a set, A is the set of all elements of \mathcal{U} which are not elements of A .

Notation

A' or A^c



Some Starter Pokémon: Visualizing Complements

 Chikorita Grass	 Cyndaquil Fire	 Totodile Water
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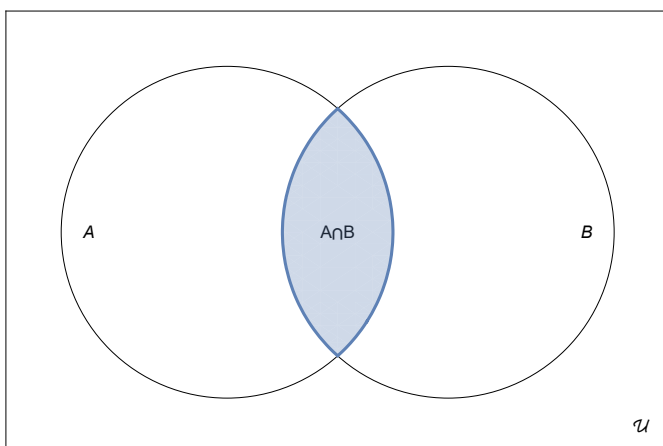
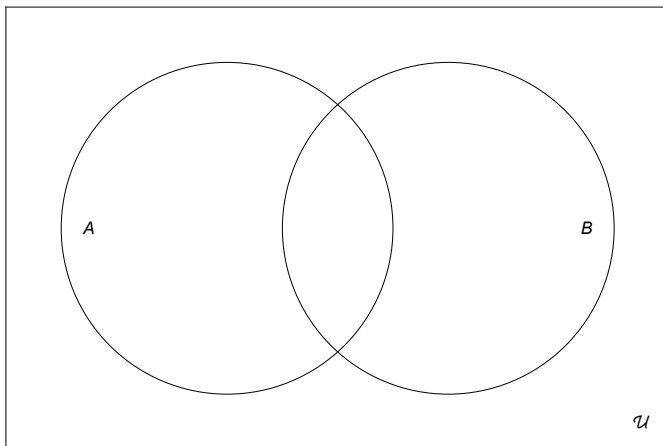
Intersections

Definition

The **intersection** of two sets, A and B , is the set of elements belonging to both.

Notation

$$A \cap B$$



Some Starter Pokémon: Visualizing Intersections

 Chikorita Grass	 Cyndaquil Fire	 Totodile Water
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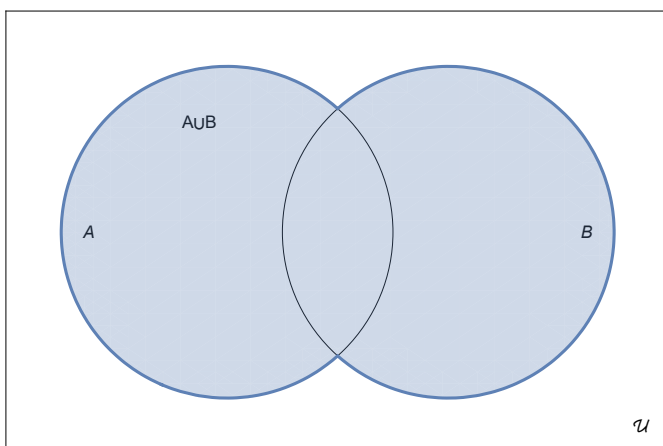
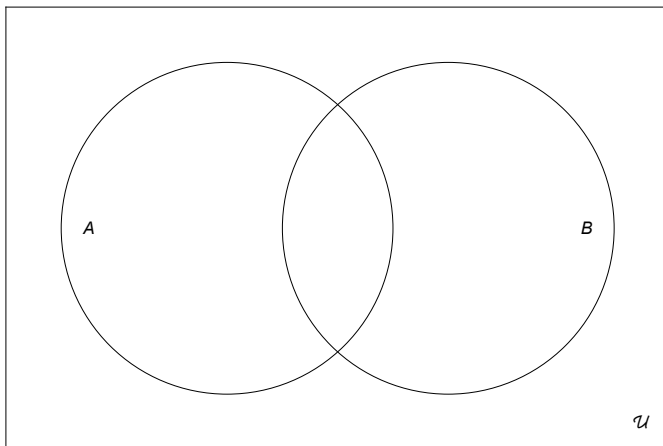
Unions

Definition

The **union** of two sets, A and B , is the set of elements belonging to set A or set B or both.

Notation

$A \cup B$



Some Starter Pokémon: Visualizing Unions

 Chikorita Grass	 Cyndaquil Fire	 Totodile Water
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 Turtwig Grass	 Chimchar Fire	 Piplup Water
 Snivy Grass	 Tepig Fire	 Oshawott Water

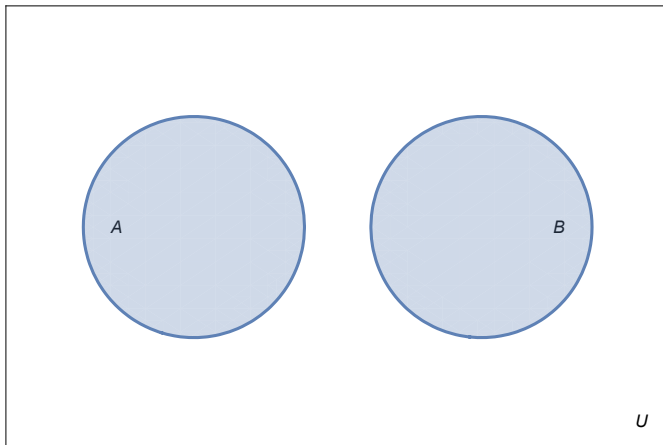
Disjoint Sets

Definition

We say two sets, A and B , are **disjoint** if they have no common elements.

Notation

Venn Diagrams



Some Starter Pokémon: Visualizing Disjoint

 Chikorita Grass	 Cyndaquil Fire	 Totodile Water
 Treecko Grass	 Torchic Fire	 Mudkip Water
 Turtwig Grass	 Chimchar Fire	 Piplup Water
 Snivy Grass	 Tepig Fire	 Oshawott Water

Some Starter Pokémon: A More Complex Example

 Chikorita Grass	 Cyndaquil Fire	 Totodile Water
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 Turtwig Grass	 Chimchar Fire	 Piplup Water
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Where the rubber meets the road: Searching in your Pokemon Bag

Intersection: &

Example: Bulbasaur & Shiny

Union: ,

Example Bulbasaur, Shiny

Complement: !

Example Bulbasaur & !Shiny

<https://niantic.helpshift.com/hc/en/6-pokemon-go/faq/1486-searching-filtering-your-pokemon-inventory/>

Top Hat Test!

Counting

Definition

The **size** of a set is the number of elements in the set.

Notation

$n(A)$

Example

$\mathcal{U} = \{\text{Students at Iowa} \mid \text{Enrolled in Pokemath}\}$

$B = \{\mathcal{U} \mid \text{Members of Blue Team}\}$

$D = \{\mathcal{U} \mid \text{Caught a Shiny Pokemon Yesterday}\}$