

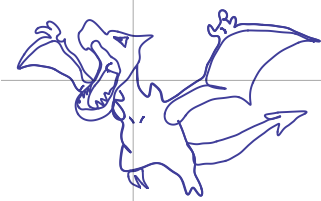
MATH:1260 Pokémath

The Mathematics of Pokémon Go[®]

Week 2 Wednesday, Spring 24

Popular curve:

Aerodactyl-like curve



Plan for Today

- Size of a Set
 - Counting abstract and in diagrams
 - Double Count Error
- Starting on Pokémon Stats

Class Reminders

- GW2 in discussion Thursday. — These are assignments
- HW1 due Wednesday (by 11:59 PM).

• HW2 will be assigned

→ Use CamScanner to upload paper HW

Counting

Definition

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

Notation

A is a set, $n(A)$ = the size

Example

$\mathcal{U} = \{\text{Pokemon} \mid \text{in my bag}\}$

$H = \{\mathcal{U} \mid \text{Hatched from eggs}\}$

$K = \{\mathcal{U} \mid \text{From Kanto}\}$

How do we find the count of each of these?



$$n(\mathcal{U}) = 345$$

$$n(H) = 18$$

$$n(K) = 128$$

$$n(U) = 345$$

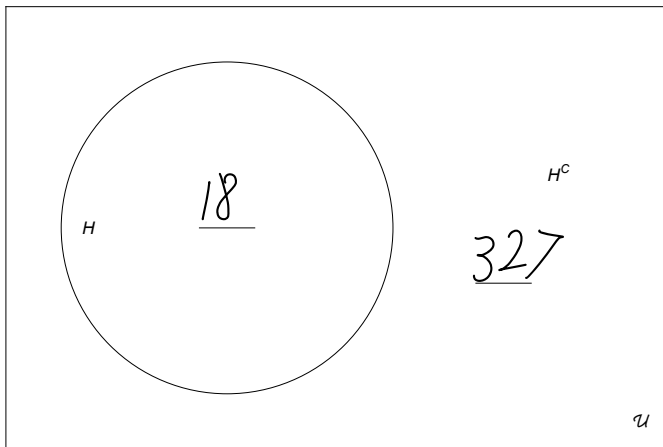
$$n(H) = 18$$

$$n(K) = 128$$

$$n(H^c) = 345 - 18 = 327$$

$$\text{In general? } n(A^c) = n(U) - n(A)$$

(this is true for finite sets. For sets with ∞ elements, size is tricky)



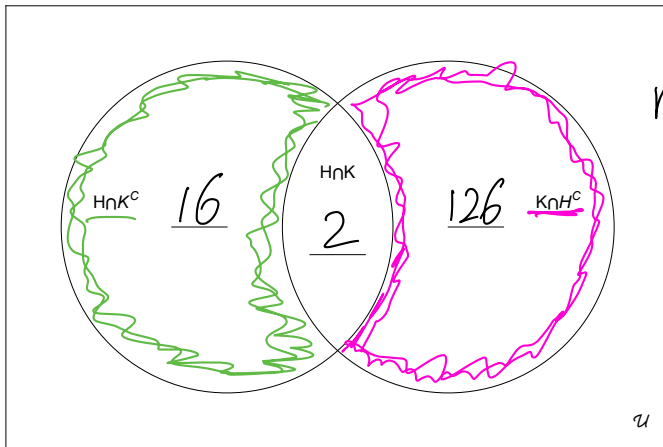
$$n(H \cap K) = 2$$

in general? look it up

$$n(U) = 345$$

$$n(H) = 18$$

$$n(K) = 128$$



$$n(A \cap B^c) = n(A) - n(A \cap B)$$



$$n(H) + n(K) - n(H \cap K) = 144$$

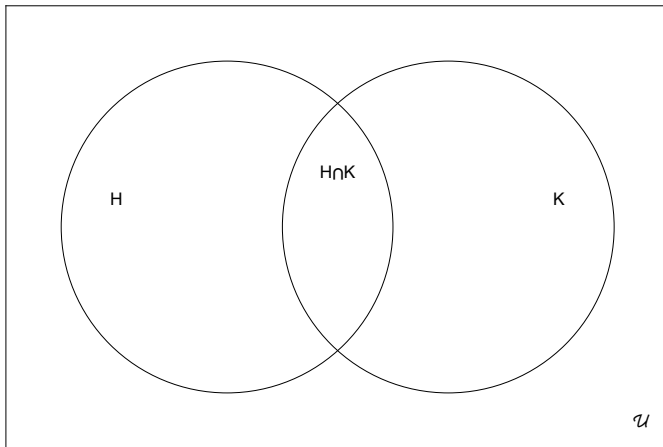
$$n(H \cup K) = 18 + 128 - 2 = 144$$

$$n(U) = 345$$

$$n(H) = 18$$

$$n(K) = 128$$

In general? $n(A \cup B) = n(A) + n(B) - n(A \cap B)$



not put the count
of a union in a
Venn diagram



Now you Try!

$\mathcal{U} = \{\text{Pokemon} \mid \text{in your bag}\}$

$N = \{\mathcal{U} \mid \text{Normal Type}\}$

$C = \{\mathcal{U} \mid \text{Pokemon was caught within 5 km}\}$

Use your pokemon bag and advanced searching to find:

$n(N) \rightarrow$ tap in the search bar, look under "normal"

$n(N^c)$ total number minus count of normals

$n(C)$ search "distance 5"

$n(N \cap C)$ search "distance 5 & normal"

$n(N \cup C) \quad n(N) + n(C) - n(N \cap C)$

The Double Counting Error

Let's say we have 37 Pokemon. 25 of them are Grass Type. 14 of them have CP above 1000. 6 are both Grass Type and have CP above 1000. How would we draw a Venn Diagram of this situation and fill in the numbers in each region?

