

# MATH:1260 Pokémath

## The Mathematics of Pokémon Go<sup>®</sup>

Week 6 Monday, Spring 24

Popular curve:

Snubbull-like curve



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## Plan for Today

- Start Module 2: Gotta Catch 'Em All!®
  - Probability in Pokemon (It's everywhere)

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## Class Reminders

- Project 1, Stage 3 is due Wednesday at Midnight
- GW5 Thursday in discussion.

\* Venn Diagram

- How to communicate the same info as your graph

## Probability

What does random mean???

- lure

- time of day

- shiny - actual random event

- weather

affect random events

other random events:

- catch

- Pokemon appearing

## Definitions

A **random experiment** has outcomes that we can not predict.

Examples:

Flip a coin.

Throw a Pokéball at a Pokémon.

Appraise a Pokémon's IVs.

A single repetition of a random experiment is called a **trial**.

Examples:

One coin flip.

One throw of a Pokéball.

Appraising a specific Pokémon

The possible results of a trial are called **outcomes**.

Examples:

Heads

Escape

1, 1, /

The **SET** of all possible outcomes is called the **sample space**.

Examples:

{Heads, Tails}

{Escape, Catch, Critical Catch, Run Away}

$\{(0,0,0), (1,0,0), (2,0,0), (3,0,0), \dots, (15,15,14), (15,15,15)\}$

## Snubbull

Let's say I caught a Snubbull. Gender assignment in Pokemon is random (mostly), so checking the Snubbull's gender is a random experiment. What is the sample space of this experiment?



$\{ \text{male, female} \}$

## More Snubbulls

Some snubbulls are shiny.



So I could classify any snubbull as

{shiny, nonshiny}

What is an **experiment** associated with shiny and nonshiny snubbulls?

"shiny check" : tapping on a Pokémon in the overworld.

What is a **trial** of this experiment?

tapping a specific Pokémon.

## More complicated experiments

s = shiny, n = nonshiny

Suppose I catch three snubbull today and check which are shiny. (New Experiment! 3 snubbulls at once!)

The event that the first is nonshiny, the second is shiny, and the third is nonshiny could be written

"nsn". *catching no shiny: "nnn"*

Using this notation, what is the sample space?

$\{ nnn, snn, nsn, nns, ssn, sns, nss, sss \}$



$$\{ nnn, snn, nsn, nns, ssn, sns, nss, sss \}$$

## Events

An **event** is a **subset** of the sample space, that contains all **outcomes** from inside the sample space that meet some **requirement**.

Examples:

The event that the first snubbull is shiny (the answer is a subset, so we will need set notation)

$$F = \{ snn, ssn, sns, sss \}$$

The event that I catch exactly two shiny snubbull

$$T = \{ ssn, sns, nss \}$$

The event that I catch at least one shiny snubbull

$$A = \{ snn, nsn, nns, ssn, sns, nss, sss \}$$

$$\{ nnn, snn, nsn, nns, ssn, sns, nss, sss \}$$

(TopHat) Write in set notation the event that I catch at least two nonshiny snubbull.

$$\{ nnn, snn, nsn, nns \}$$

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## Ask Away

What questions do you have about catching Pokémon®?