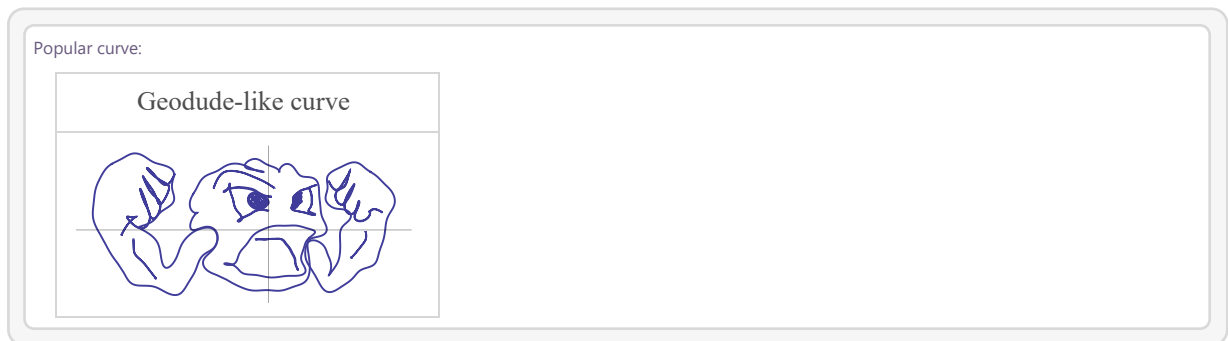


Pokémath: Homework 5



Pokémon® Problems

Each Pokémon® has IV values between 0 and 15 for Attack, Defense, and HP. When you catch a regular wild Pokémon, any of these values are equally likely. So **any combinations of IV values** are equally likely outcomes.

Notation:

I just caught a Geodude with an Attack IV of 0, Defense IV of 13, and an HP IV of 4. We will denote the IVs of this Geodude as 0/13/4.

Using this notation, our **sample space** for any wild Pokémon catch is:

$$S = \{0/0/0, 0/0/1, 0/1/0, 1/0/0, 0/0/2 \dots 14/15/15, 15/15/15\}$$

1) Since there are 16 possible values for each IV, there are a total of $16^3 = 4096$ possible combinations of IVs! All of them are equally likely. Using this information, compute the **probabilities** of the following in a regular wild catch.

- a) Perfect IVs: 15/15/15
- b) Nearly perfect: IVs add up to *exactly* 44.
- c) Pokémon® has 15 Defense IV and 15 HP IV.

d) Catching a Pokémon® with 15/15/15 *and then* catching a Pokémon® with 0/0/0

e) Catching a Pokémon® with IVs adding up to exactly 44 *and then* catching a Pokémon® with 15 Defense IV and 15 HP IV.

2) If you get a “Lucky Trade” with a friend, the Pokémon® they give you will be guaranteed to have IVs of 12 or higher in every stat. That means there are only 4 possibilities for each IV, so there is a total of $4^3 = 64$ possible IVs for Lucky Trades. Using this information, compute the **probabilities** of the following in a lucky trade.

a) Perfect IVs: 15/15/15

b) Nearly perfect: IVs add up to *exactly* 44.

c) Pokémon® has 15 Defense IV and 15 HP IV.

d) Catching a Pokémon® with 15/15/15 *and then* catching a Pokémon® with 0/0/0

e) Catching a Pokémon® with IVs adding up to exactly 44 *and then* catching a Pokémon® with 15 Defense IV and 15 HP IV.

3) Unlucky lucky trade: A two star Pokémon® has IVs totaling anywhere between 30 and 36. What is the probability of getting a two-star Pokémon® in a lucky trade?