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## Pokémath: Group Work 5

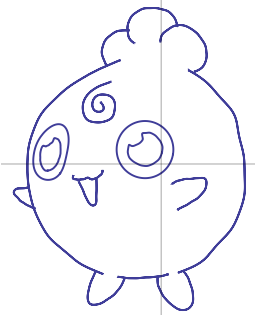
Name \_\_\_\_\_, \_\_\_\_\_

I caught two rascals trying to steal my baby Igglybuff last night. Turns out they're part of a secret evil organization called **Team Cyclone**, bitter rivals to the our Pokémon® GO community. But these were only two of their members, I'm sure there are many more out there we may need to outsmart--or rather, out-math.

Now that we know who our enemies are, it's time to kick things into gear. We cannot allow Team Cyclone to ruin our training! If we're going to beat Team Cyclone, we're gonna need to know the ins and outs of Pokemon probability. Let's practice!

Popular curve:

Igglybuff-like curve



Consider the bag of Johto baby Pokémon<sup>®</sup> given below in set notation. Some of them are shiny Pokémon<sup>®</sup>. **The random experiment is to draw one of these ten Pokémon<sup>®</sup> from the bag.** Our sample space is

$$S = \{\text{pichu, cleffa, igglybuff, togepi, shiny togepi, tyrogue, smoochum, elekid, magby, shiny magby}\}$$

For reference here are the types of the species listed above.

Pichu are Electric.

Cleffa are Fairy.

Igglybuff are Normal and Fairy.

Togepi are Fairy.

Tyrogue are Fighting.

Smoochum are Ice and Psychic.

Elekid are Electric.

Magby are Fire.

1) Consider the following events:

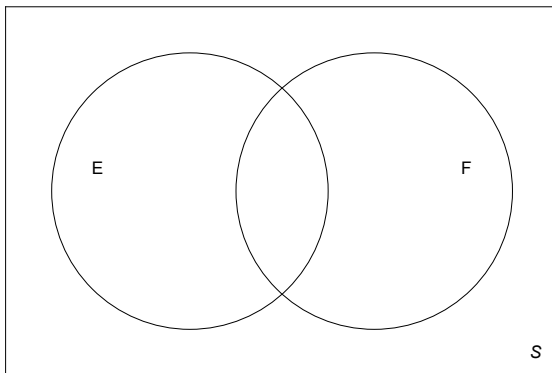
$E$  = The Pokémon<sup>®</sup> is Shiny

$F$  = The Pokémon<sup>®</sup> is Fairy type

a) Write each event as a set in list notation.

2) Consider the event  $E \cap F$ .

a) Shade the region in the Venn Diagram that corresponds to this event

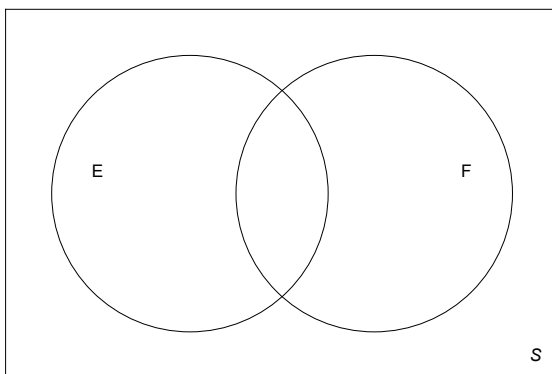


b) Describe this event in words.

c) Give this event as a set in list notation.

3) Consider the event  $E \cup F$ .

a) Shade the region in the Venn Diagram that corresponds to this event

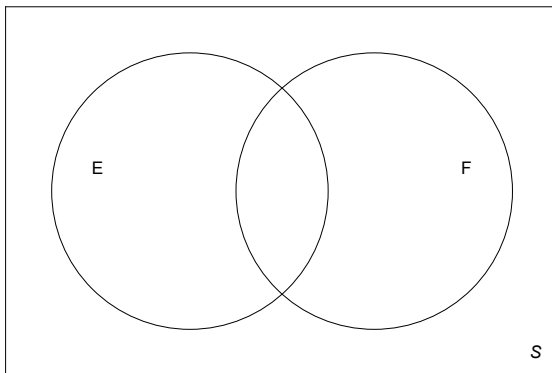


b) Describe this event in words.

c) Give this event as a set in list notation.

4) Consider the event  $E^c$ .

a) Shade the region in the Venn Diagram that corresponds to this event

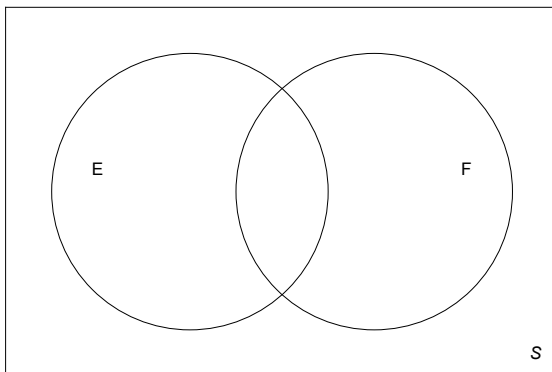


b) Describe this event in words.

c) Give this event as a set in list notation.

5) Consider the event  $E^c \cap F$ .

a) Shade the region in the Venn Diagram that corresponds to this event



b) Describe this event in words.

c) Give this event as a set in list notation.

6) The Basic Probability Principle says: Let  $S$  be a sample space of equally likely outcomes. Let event  $E$  be a subset of  $S$ . The probability that event  $E$  occurs is  $\frac{n(E)}{n(S)}$ . Assuming drawing each Pokémon® out of our bag is equally likely, find the probabilities of the following events.

- a) A fairy type Pokémon® is drawn.
- b) A shiny Pokémon® is drawn.
- c) A shiny fairy type Pokémon® is drawn.
- d) A nonshiny Pokémon® is drawn.
- e) A shiny Pichu is drawn.
- f) A Togepi or a shiny Pokémon® is drawn.

7) **Let's do a new experiment.** Now I am drawing **two** Pokémon<sup>®</sup> from the bag of ten. Describe the sample space  $S$  in words (no need to write the set). What is  $n(S)$  now?