How to Get Good at SET

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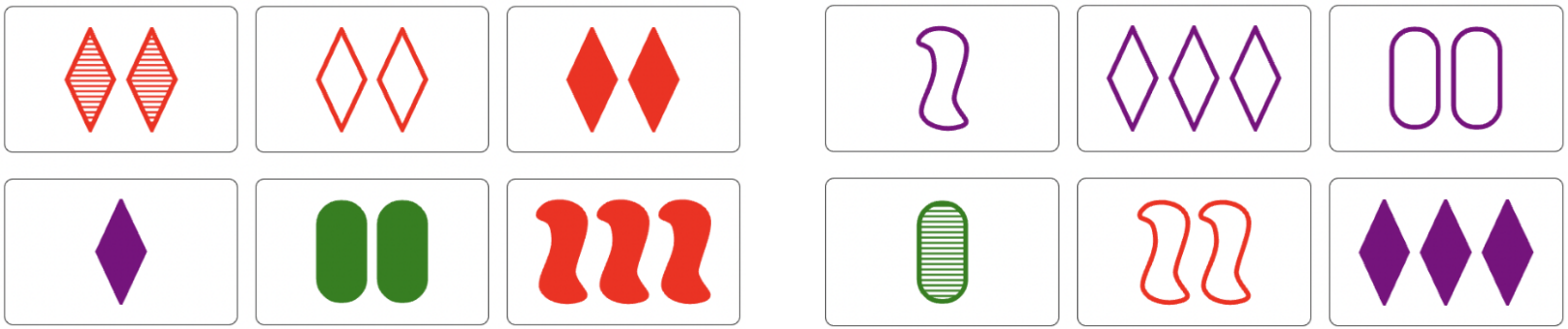
The Rules of SET

Each SET card has 4 properties:

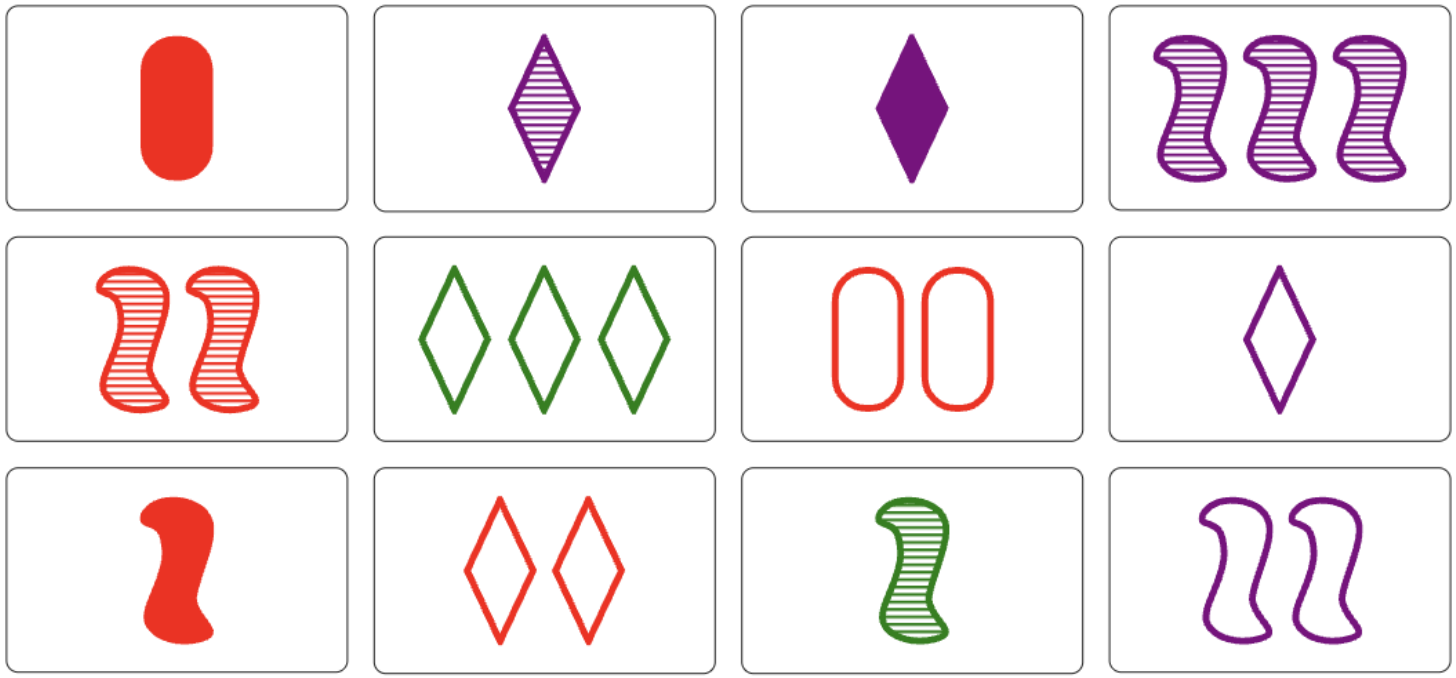
- Color: red, green, or purple
- Shape: oval, squiggle, or diamond
- Shading: empty, striped, or filled
- Number: one, two, or three.

A set is 3 cards such that for *each property*, all 3 cards are either the same or all different.



Let's Practice!

Can you find 4 sets on this board?



Q1.

Question

How many possible sets are there?

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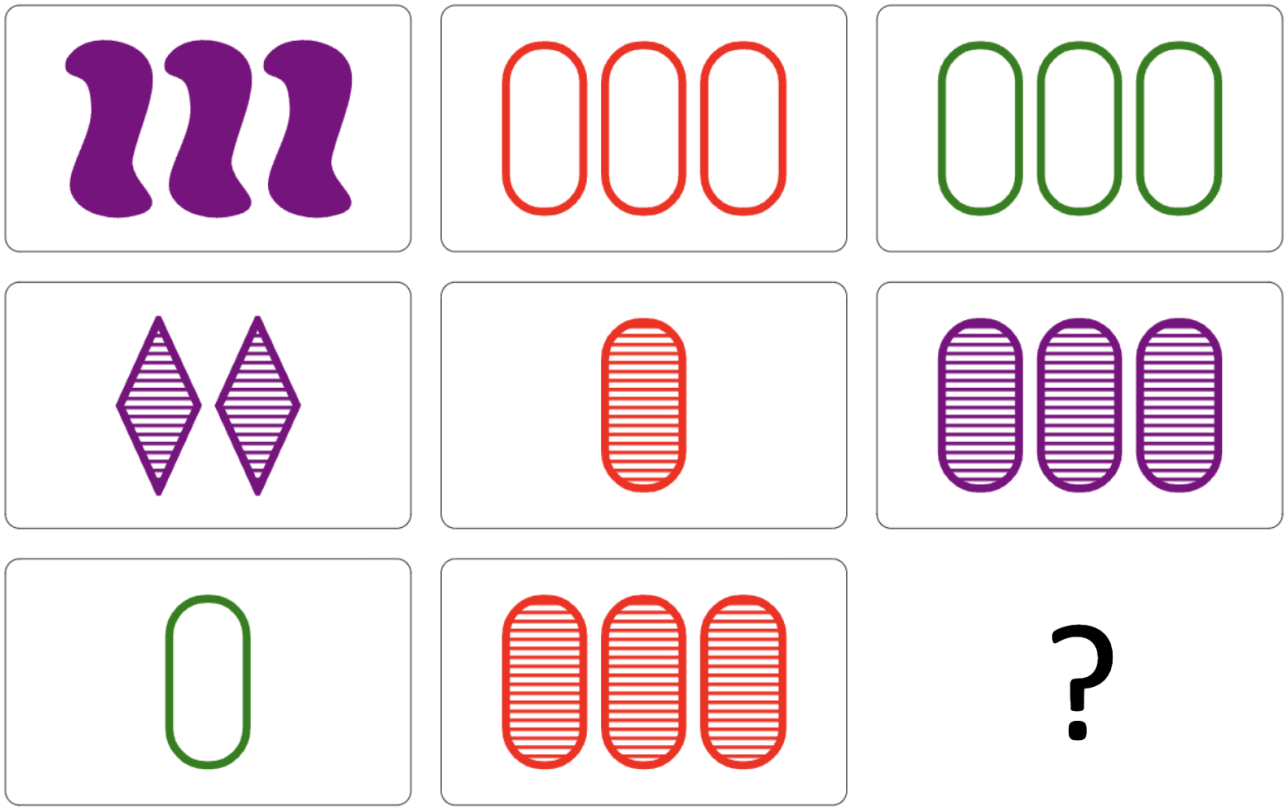
Two cards in a set uniquely determine the third card, so there are

$$\frac{\binom{81}{2}}{\binom{3}{2}} = 1080 \text{ sets.}$$

Q2.

Question

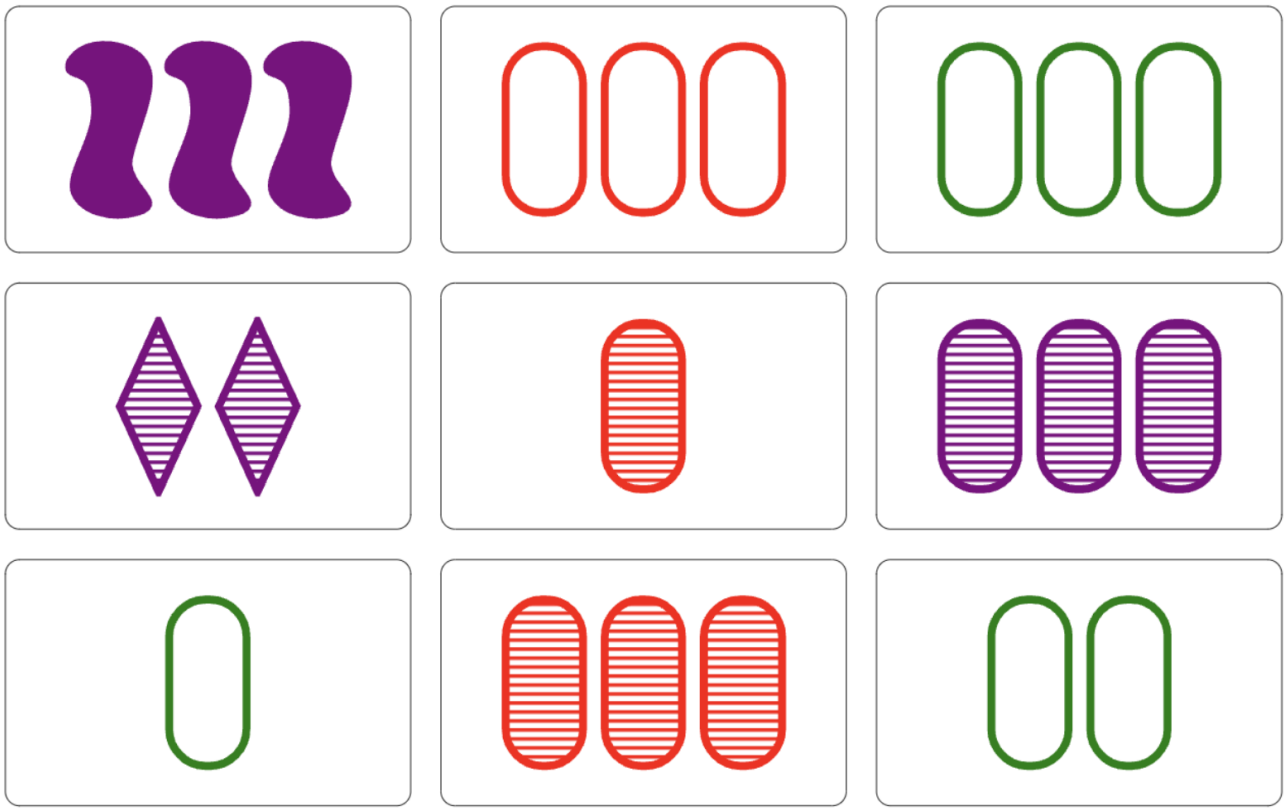
Find the set in the last 9 cards.



Q2.

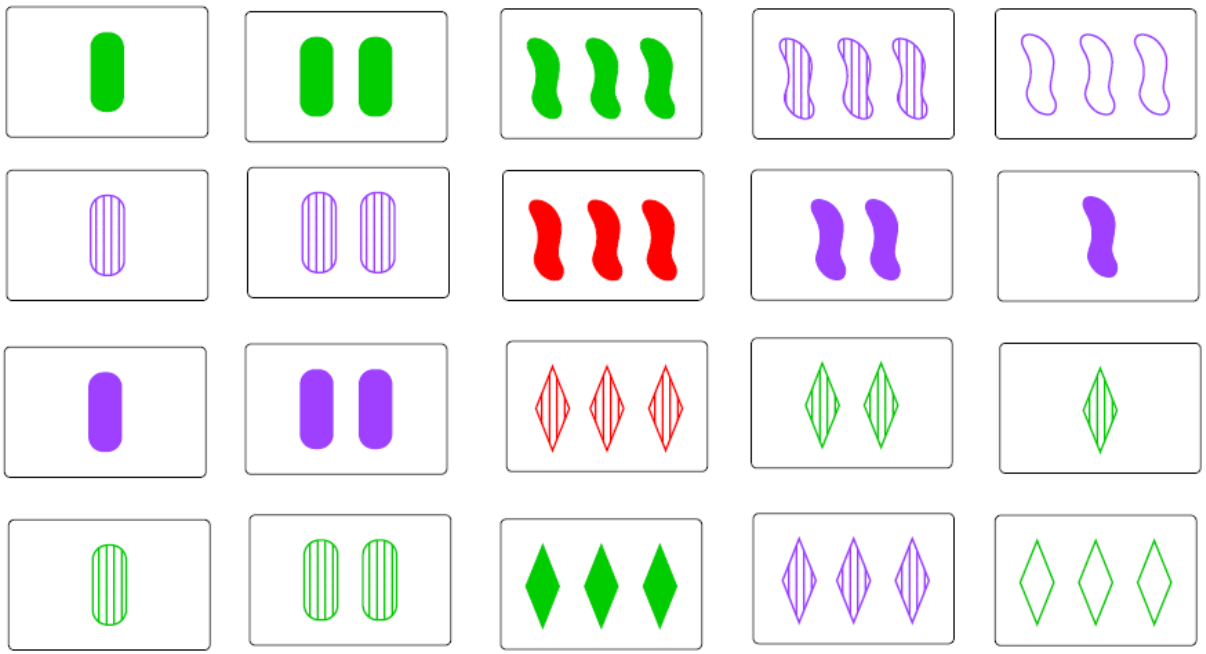
Question

Find the set in the last 9 cards.



Fun Facts about SET

- 21 cards are required to guarantee a set.
- The probability of there being no set in a board of 12 cards during a game is about 7%.
- About 30% of games always have a set among the 12 cards.

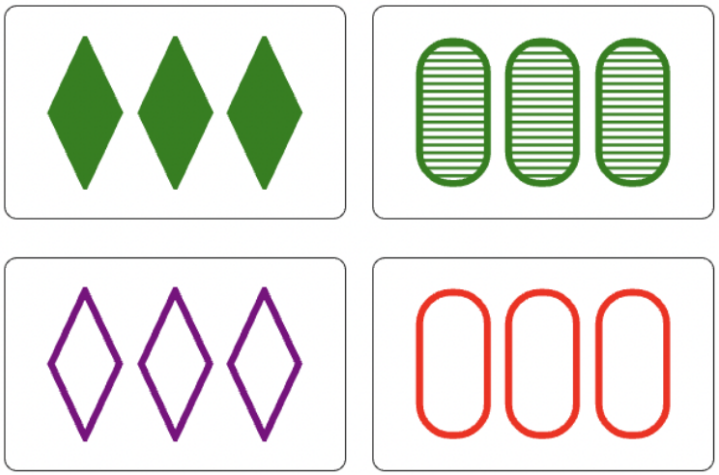


Tips for SET (besides just playing a lot)

- At first you might have to spend more time looking at each card and searching for particular cards, but the eventual goal will be to scan most of the board at once.
- Pay special attention to the newly dealt cards whenever 3 additional cards are dealt.
- Practice picking two cards and visualizing the third.
- First searching within a certain property if there are a lot of such cards can be good.
- Find the best property to casework on, especially if there are only 1 or 2 of e.g. red cards. In this case, do casework by color with red and whichever out of green/purple has fewer cards.

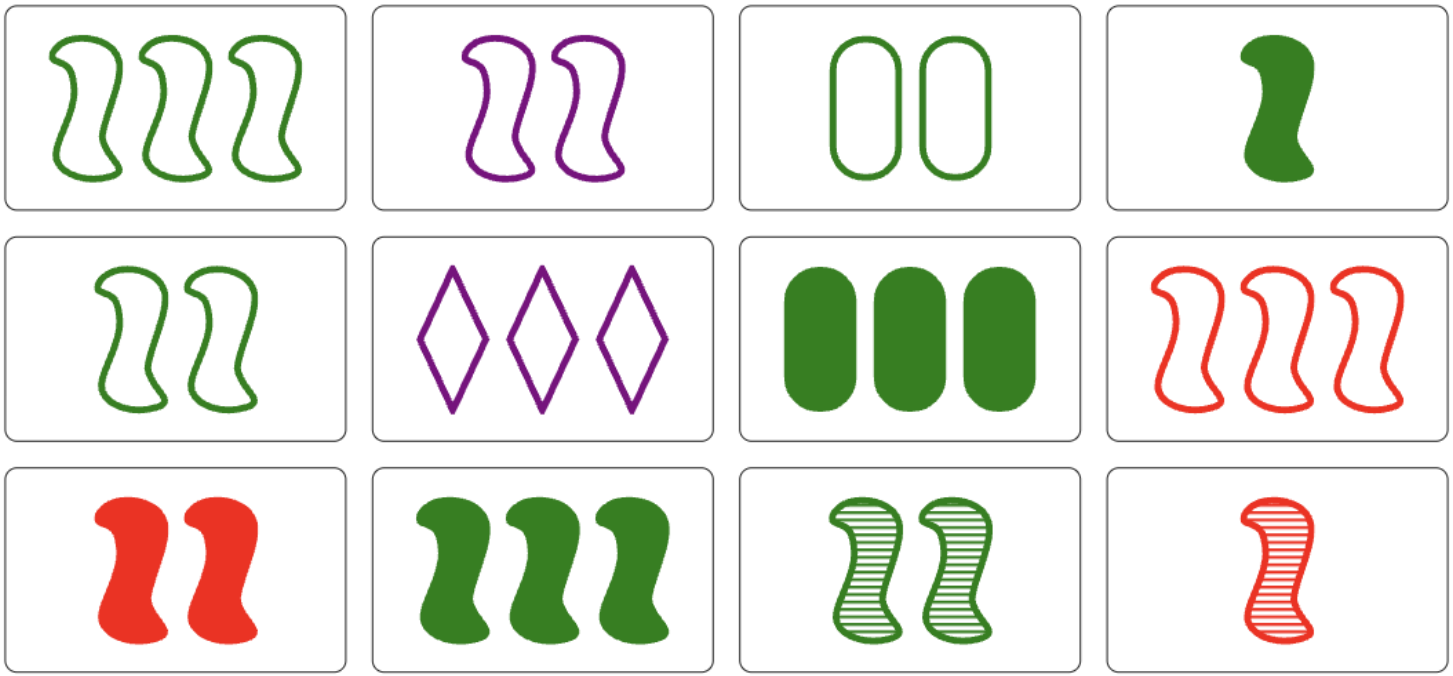
The Rules of UltraSET

An ultraset is four cards A, B, C, D such that A, B and C, D have the same third SET-forming card.



Tips for UltraSET

- Two cards that differ only in one property and two other cards also differ only in that property form an ultraset.
- Noticing sets can be useful if there are two overlapping sets on the board.



Q3.

Question

Given three cards, how many possibilities are there for a fourth card such that the four cards form an ultraset?

Q3.

Question

Given three cards, how many possibilities are there for a fourth card such that the four cards form an ultraset?

If the three cards form a set, then there is no ultraset containing them. Otherwise, there are 3 possibilities for a fourth ultraset-forming card.

Q4.

Question

How many possible ultrasets are there?

Q4.

Question

How many possible ultrasets are there?

We previously computed that there are 1080 sets, so there are $\binom{81}{3} - 1080$ choices of three cards that don't form a set, yielding

$$3 \cdot \frac{\binom{81}{3} - 1080}{\binom{4}{3}} = 63180 \text{ ultrasets.}$$

Alternatively, given an intersection card, there are 40 sets including that card, so there are $81 \cdot \binom{40}{2} = 63180$ ultrasets.

Fun Facts about UltraSET

- 10 cards are needed to guarantee an ultraset.
- However, the probability that there is no ultraset in 9 cards is approximately 0.005%.

Fun Links

- https://setwithfriends.com/
- SET, UltraSET, and Set Chain Leaderboards
- Sets, Planets, and Comets

Q & A