

Number of cards and number of possible Sets

Q: How many cards are there in a Set deck?

3 colours



3 shapes



3 numbers

1 2 3

3 shadings



$$3 \times 3 \times 3 \times 3 = 3^4 = 81$$

Number of cards and number of possible Sets

Q: How many possible Sets are there?

Recall: For every pair of cards, there is a unique third card which forms a Set.

Let's say we choose 3 different cards, one after the other.

$$\# \text{ of sets} = \frac{\# \text{ of ways to choose a Set}}{\# \text{ of ways to choose the same Set}}$$

$$\# \text{ of ways to choose a Set} = \begin{array}{l} 81 \text{ choices} \\ \text{for the first} \\ \text{card} \end{array} \times \begin{array}{l} 80 \text{ choices} \\ \text{for the} \\ \text{second card} \end{array} \times \begin{array}{l} 1 \text{ choice} \\ \text{for the} \\ \text{third card} \end{array} = 81 \times 80$$

$$\# \text{ of ways to choose a given Set} = 3 \text{ choices} \times 2 \text{ choices} \times 1 \text{ choice} = 3 \times 2 \times 1 = 6$$

$$\text{Total } \# \text{ of Sets} = \frac{81 \times 80}{3 \times 2} = 27 \times 40 = \boxed{1080}$$