PROBABILITY – example 1

For a "Prix Fixe" meal at a restaurant, patrons are to select an appetizer, a main dish, a side, and a desert. If the menu offers a choice of 13 appetizers, 10 main dishes, 8 side dishes and 3 desserts, how many meal combinations are possible?

① ② ③ ④

$13 \cdot 10 \cdot 8 \cdot 3 = \boxed{3,120}$

PROBABILITY – example 2 (independent events)

The probability of having identical twins is 1/285. What is the probability that a couple has three consecutive sets of identical twins?

① ② ③

$\left(\frac{1}{285}\right) \cdot \left(\frac{1}{285}\right) \cdot \left(\frac{1}{285}\right)$

$= \left(\frac{1}{285}\right)^3 = 0.000000043$

PROBABILITY – example 3

The probability that two people have different birthdays is 0.997. What is the probability that two people have the same birthday?

$1 - 0.997 = \boxed{0.003}$

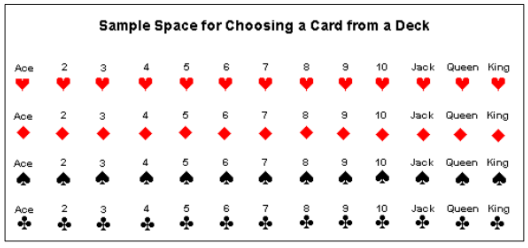
$P(A) + P(\text{not } A) = 1$

PROBABILITY – example 4

A standard deck of cards has 52 cards (as represented below). If three cards are dealt, what is the probability that all three are Queens?

→ no replacement

(dependent events)



R R B B

4 suits (♡, ♢, ♤, ♧)

13 cards in each suit

3 face cards (J, Q, K) in each suit

① ② ③

$\frac{4}{52} \cdot \frac{3}{51} \cdot \frac{2}{50}$

$= \frac{24}{132{,}600}$

$= \boxed{0.00018}$

PROBABILITY – example 5

A pollster must randomly select 3 of 12 available people. How many different groups of 3 are possible?

Combination

$$_{12}C_3 = \frac{12!}{9!3!} = \frac{12 \cdot 11 \cdot 10}{3 \cdot 2 \cdot 1}$$

$$= \boxed{220}$$

PROBABILITY – example 6

The hover-board club must elect 4 officers (president, vice-president, parliamentarian, and secretary) from 16 available candidates. How many different slates are possible if one candidate is elected for each office?

Position matters
permutation

$$_{16}P_4 = \frac{16!}{12!}$$

$$= 16 \cdot 15 \cdot 14 \cdot 13$$

$$= \boxed{43,680}$$