

Day 7: Perms, Combs and Probabilities

Permutation: An arrangement of items in which order is important.

Combination: A selection of items in which order is not important.

$$P(\text{event}) = \frac{\text{favorable}}{\text{Total}}$$

$$P(\text{rolling 3}) = \frac{\textcircled{1}}{\textcircled{6}}$$

$$P(\text{even}) = \frac{\textcircled{2}, 3, 5, \textcircled{8}, 9, 11}{6} = \textcircled{\frac{1}{3}}$$

Eg 1) A five card hand is dealt using a deck of 52 cards.
 What is the probability of each event?

a. All five cards are diamonds.

$$\frac{\text{Favorable}}{\text{Total}} = \frac{{}^{13}C_5}{{}^{52}C_5} = \frac{1287}{2,598,960}$$

0.000495

b. There are exactly 4 diamonds in the hand.

$$\frac{{}^{13}C_4 \times {}^{39}C_1}{{}^{52}C_5} = 0.010729$$

c. There are exactly 3 diamonds in the hand.

$$\frac{{}^{13}C_3 \times {}^{39}C_2}{{}^{52}C_5}$$

Eg 2) A class of 30 students is electing a president, vice-president and treasurer.

- a. What is the probability that Ann is elected president, Betty vice-president and Carl treasurer?

$$\begin{array}{c} P \\ \frac{1}{30} \end{array} \times \begin{array}{c} V \\ \frac{1}{29} \end{array} \times \begin{array}{c} T \\ \frac{1}{28} \end{array} = \frac{1}{24360}$$

$\frac{1}{30P_3}$

- b. What is the probability that Ann, Betty and Carl are elected to the three positions but not necessarily in that order?

$$\frac{1}{30C_3} = \frac{1}{4060}$$

Assignment
Pg. 444 1, 3, 4, 8, 9, 11, 13, 18, 21