5.3 Probability

Example 1: The letters of the word ASYMPTOTE are being arranged. What is the probability that the resulting arrangement:

a) Spells ASYMPTOTE?

A = spells asymptote

$n(A) = 1$

$n(S) = \frac{9!}{2!} = 181,440$

$P(A) = \frac{1}{181,440}$ or 0.0006 % chance

b) Begins with S?

B = begins w/ S

$n(B) = \frac{8!}{2!} = 20,160$

$P(B) = \frac{20,160}{181,440} = \frac{1}{9}$ or 11.1 % chance

c) Has the S and Y apart?

C = S & Y apart

$n(C) = 181,440 - \frac{8!\,2!}{2!} = 141,120$

$P(C) = \frac{141,120}{181,440} = \frac{7}{9}$ or 77.8 % chance

Example 2: Yasmin draws three cards from a standard deck of cards and places them in a row. What is the probability that all three cards are all kings **or** all queens?

A = 3K or 3Q

$n(A) = {}_4P_3 + {}_4P_3 = 48$

$n(S) = {}_{52}P_3 = 132,600$

$P(A) = \frac{48}{132,600} = \frac{2}{5525}$ or 0.04 % chance

Example 3: Minh draws five cards from a standard deck of cards and places them in a row. What is the probability that all five cards are all face cards **or** all red cards?

B = 5F or 5R

$n(B) = {}_{12}P_5 + {}_{26}P_5 - {}_6P_5 = 7,987,920$

(-2(6P5) if just OR, not AND/OR) "double overlap"

$n(S) = {}_{52}P_5 = 311,875,200$

$P(B) = \frac{7,987,920}{311,875,200}$ = 2.6 % chance