K19FG-L1

Thursday, January 14, 2021
8:40 AM

In a random arrangement of the letters of the word "COMMERCE". Find the probability that all the vowels come together.

"mathematics", Apple,

$$P(E) = \frac{\text{No. of fav results}}{\text{Total no. of results}} = \frac{\text{No. of fav. Cases}}{\text{Total no. of Cases}}$$

MATH

$$\frac{4!}{0!} = 4!$$

Soln:- No. of arrangement $\boxed{= \frac{8!}{2!2!2!}}$

If all the vowels comes together, we get COMMERCE

CMMRC(OEE)

$$\text{fav. arrangement} = \frac{6!}{2!2!} \cdot \frac{3!}{2!}$$

$$P(E) = \frac{\frac{6!}{2!2!} \cdot \frac{3!}{2!}}{\frac{8!}{2!2!2!}}$$ Ans

$\boxed{\frac{11!}{2!2!2!}}$

MATHEMATICS

$$\text{MTHMTCS(AEAI)} = \boxed{\frac{8!}{2! \cdot 2!} \cdot \frac{4!}{2!}}$$

$$P(E) = \boxed{\frac{\frac{8!}{2!2!} \cdot \frac{4!}{2!}}{\frac{11!}{2!2!2!}}} = \boxed{}$$ Ans

A $\quad \bar{A} \quad P(\bar{A}) = 1 - P(A)$, $P(\phi) = 0$, $P(S) = 1$

$P(\bar{A} \cap B) = P(B) - P(A \cap B)$

$P(A \cap \bar{B}) = P(A) - P(A \cap B)$

$P(B \cap \bar{A}) = P(B) - P(B \cap A)$

$P(\bar{B} \cap A) = P(A) - P(A \cap B) = P(A) - P(B \cap A)$

Let there are three events A, B, C.

(i) At least one of A, B, C $= A \cup B \cup C$

(ii) None of A, B, C $= \bar{A} \cap \bar{B} \cap \bar{C}$

(iii) Exactly one event $= (A \cap \bar{B} \cap \bar{C}) \cup (\bar{A} \cap B \cap \bar{C}) \cup (\bar{A} \cap \bar{B} \cap C)$

$(A \cap \bar{B}) \cup (\bar{A} \cap B)$

(iv) $P(\bar{A} \cap \bar{B} \cap \bar{C}) = P(\overline{A \cup B \cup C}) = 1 - P(A \cup B \cup C)$

Addition Theorem :- A and B are two events then

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(B \cap C) - P(C \cap A) + P(A \cap B \cap C)$

Ex 3.27 If $P(A) = p_1$, $P(B) = p_2$ and $P(A \cap B) = p_3$ then find

$P(\bar{A} \cup \bar{B}) = ?$

Sol^n:— $\because$ $P(\bar{A} \cup \bar{B}) = P(\bar{A}) + P(\bar{B}) - P(\bar{A} \cap \bar{B})$

$= (1-p_1) + (1-p_2) - \{P(\overline{A \cup B})$

$(1-p_1) + (1-p_2) - (1-P(A \cup B))$

$(1-p_1) + (1-p_2) - (1) + P(A) + P(B) - P(A \cap B)$

$1 - \cancel{p_1} + \cancel{1} - \cancel{p_2} - \cancel{1} + \cancel{p_1} + \cancel{p_2} - p_3 = 1 - p_3$

Ans

$P(\bar{A} \cup \bar{B}) = P(\overline{A \cap B}) = 1 - P(A \cap B) = 1 - p_3$ Ans

Ex 3.30 ~~If~~ two dice are thrown, what is the prob. that sum is neither 7 nor 11.

1, 2, 3, 4, 5, 6

1, 2, 3, 4, 5, 6

$6 \times 6 = 36$

Sol^n:— A : sum is 7 , B : sum is 11

$P(\bar{A} \cap \bar{B}) = P(\overline{A \cup B}) = 1 - P(A \cup B)$

$= 1 - P(A) - P(B) + P(A \cap B)$

$\because \{(1+6), (2+5), (3+4), (4+3), (5+2), (6+1)\} = 7$

∴ {(1+6), (2+5), (3+4), (4+3), (5+2), (6+1)} = 6

$$P(A) = \frac{6}{36} = \frac{1}{6}$$

Similarly for sum 11 : (5+6), (6+5)

$$P(11) = \frac{2}{36} = \frac{1}{18}$$

∴ $A \cap B = \phi \Rightarrow P(A \cap B) = 0$

$$\Rightarrow P(\bar{A} \cap \bar{B}) = 1 - \frac{1}{6} - \frac{1}{18} =$$

(1,1), (1,2), (1,3), (1,4)
(1,5), (1,6), (2,1), (2,2), (2,3)
(2,4), (2,5)