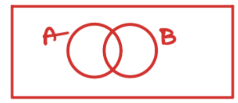
$A \cup B$	A or B have happened.
$A \cap B$	A and B have happened.
$A \setminus B$	A has happened but not B.

$A \cup B$	P(Coin land heads or die rolls to odd number)
$A \cap B$	P(coin lands heads <u>and</u> die rolls to odd number)
$A \setminus B$ $A \cap B^c$	P(coin lands heads <u>and</u> die does not roll to odd number)

Wednesday, 11 September 2024 10:27 PM

Prob formulas are equivalent to set theory f^n

inclusion exclusion when intersecting sets



① $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

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

② $n(A - B) = n(A) - n(A \cap B)$

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

③ $n(A' \cap B) = n(B) - n(A \cap B)$

$\Rightarrow P(A' \cap B) = P(B) - P(A \cap B)$

④ $n(A \cap B') = n(A) - n(A \cap B)$

$\Rightarrow P(A \cap B') = P(A) - P(A \cap B)$

⑤ $n(A \cap B) = 1 - n(\bar{A} \cup \bar{B})$

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

⑥ $n(\bar{A} \cup \bar{B}) = 1 - n(A \cap B)$

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

⋮

(Q) Consider randomly selecting a student at a certain university, and let A denote the event that the selected individual has a "VISA-credit card" and B be the analogous event for a Master Card. Suppose that $P(A) = 0.5$, $P(B) = 0.4$, and $P(A \cap B) = 0.25$.

or 50%

$S = \{$ all students in university $\}$.

(a) Compute the Prob that the selected individual has $\boxed{\text{atleast}}$ one of the two types of cards.

"means union"

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

$= 0.5 + 0.4 - 0.25 = \boxed{0.65}$ ans.

(b) Probability that the selected individual has neither type of card?

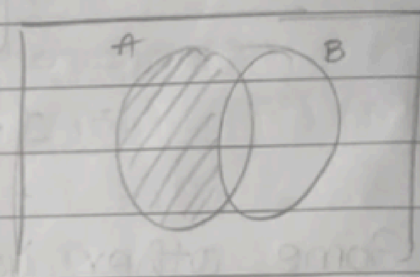
$= 1 - P(A \cup B) = 1 - 0.65$

$= \boxed{0.35}$

(c) Describe in terms of A and B, the event that the selected students have a visa-card but not a Master Card, and then calculate probability of event

$= (A) - (A \cap B)$

$= \boxed{A \cap B'}$



$\therefore P(A \cap B') = P(A) - P(A \cap B)$

$= 0.5 - 0.25$

$= \boxed{0.25}$