

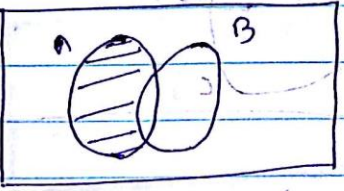
Home Work – 1

Home Work 1.1

QUESTION = (3-8) HOME WORK 7.1. (A U A) [5]

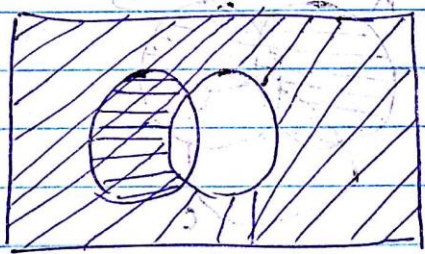
① $A - B = A \cap \bar{B} = \text{TRUE}$

⊛ $A - B$



A Venn diagram showing two overlapping circles, A and B, within a rectangular universal set. The region of circle A that does not overlap with circle B is shaded with horizontal lines.

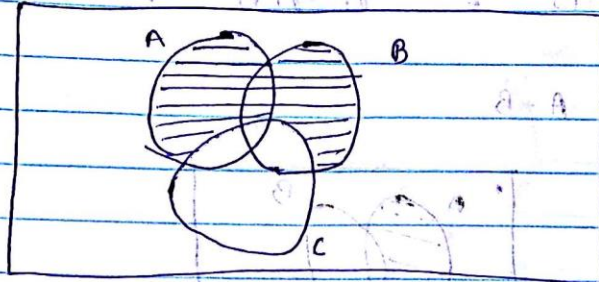
⊛ $A \cap \bar{B}$



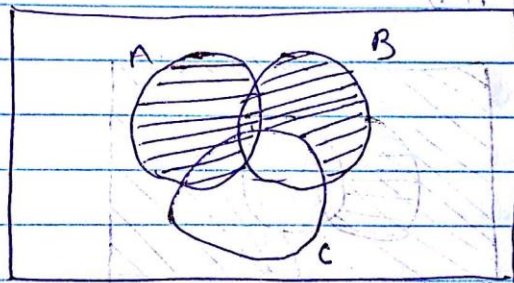
A Venn diagram showing two overlapping circles, A and B, within a rectangular universal set. The entire rectangular area is shaded with diagonal lines. The region of circle A that does not overlap with circle B is also shaded with horizontal lines, representing the intersection of A and the complement of B.

[2] $(A \cup B) - C \neq A \cup (B - C) = \text{FALSE}$

* $(A \cup B) - C$

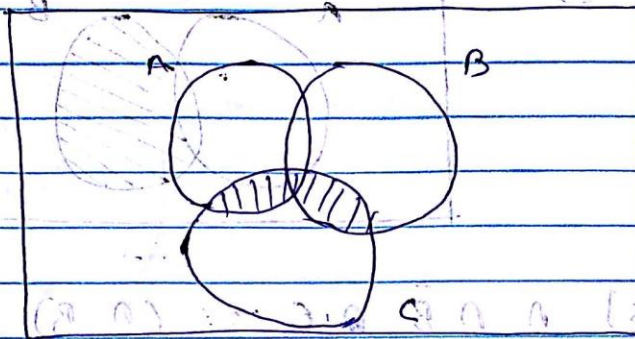


* $A \cup (B - C)$

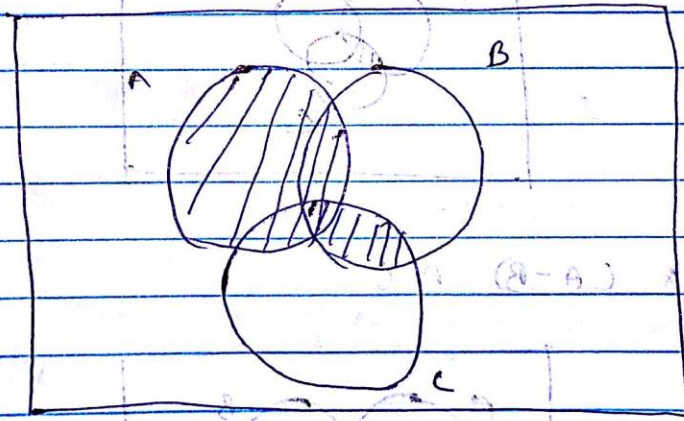


[3] $(A \cup B) \cap C \subseteq A \cup (B \cap C)$ [FALSE]

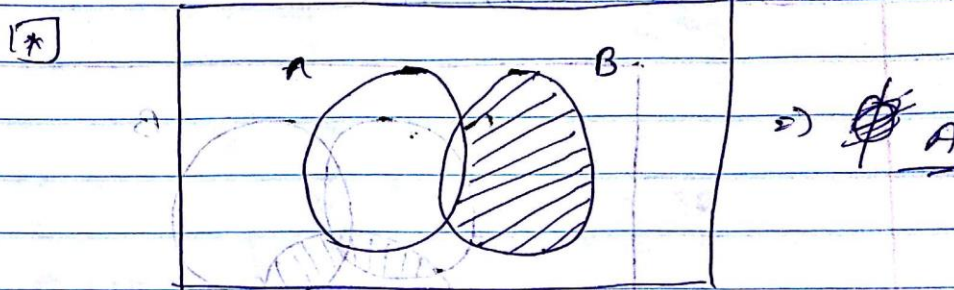
[*] $(A \cup B) \cap C$



[*] $A \cup (B \cap C)$

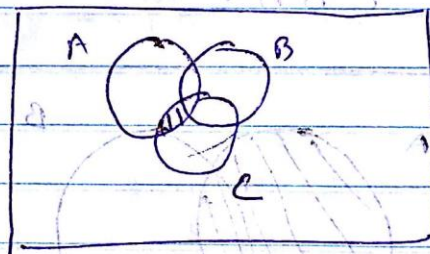


32] [4] $(A - B) \cap (\bar{A} \cap B) = A$ [FALSE]
 [TRUE]

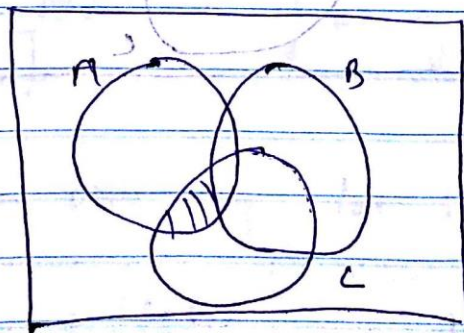


[5] $A \cap \bar{B} \cap C = (A - B) \cap C$ [TRUE]

[*] $A \cap \bar{B} \cap C$



* $(A - B) \cap C$

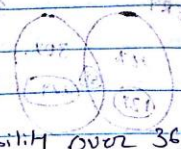


Home Work 1.2

HOME WORK 1.2

⇒ Possibility of getting 7

$$\left. \begin{array}{l} \Rightarrow 4+3 \\ \Rightarrow 3+4 \\ \Rightarrow 6+1 \\ \Rightarrow 1+6 \\ \Rightarrow 5+2 \\ \Rightarrow 2+5 \end{array} \right\}$$



6 Possibility over 36

So that, probability of losing a dollar is

$$6/36 = \boxed{1/6}$$

⇒ Possibility of getting 2

$\Rightarrow 1+1 \Rightarrow 2$ | 1 Possibility over 36

So that, probability of winning 2 dollars is

$$\boxed{1/36}$$

⇒ If Juan will play for long time then,

$$(2) \frac{1}{36} + (-1) \frac{1}{6} = \frac{1}{18} - \frac{1}{6}$$

$$= \frac{1-3}{18} = -\frac{2}{18} = \boxed{-1/9}$$

⇒ Eventually he will lose dollar for long time play.

Home Work 1.3

S 1 Home Work 1.3

JEERY SUSAN

20% 30%

12% 22%

8%

⇒ CASE: 1

SUSAN was at the bank last Monday.

→ what is the prob. for Jerry to go to the bank?

$$P(J|S) = \frac{P(J \cap S)}{P(S)}$$

$$= \frac{0.08}{0.3}$$

$$= 0.2667$$

i.e. 26.67%

It for me went to phone bank last night
 ⇒ CASE 2: Last Friday, Susan wasn't at bank.
 What's the probability that Jerry was there.

$$P(J|\bar{S}) = \frac{P(J \cap \bar{S})}{P(\bar{S})} = \frac{P(J) - P(J \cap S)}{1 - P(S)}$$

$$= \frac{0.20 - 0.08}{1 - 0.3}$$

$$= \frac{0.12}{0.7}$$

$$= 0.1714$$

Probability is 17.14%

Case c: Last Wednesday at least one of them was at bank. Find the probability of both were there.

$$P\left(\frac{JNS}{JUS}\right) = \frac{P(JNS) \cap P(JUS)}{P(JUS)}$$

$$\frac{0.05}{0.42} = \frac{P(JNS)}{P(JUS)}$$

$$\begin{aligned} \text{RHS} &= \frac{0.05}{0.42} \\ &= 0.1904 \end{aligned}$$

Probability : 19.04 %

Home Work 1.4

HOME WORK 1.4

⇒

[a] $P(H \cup S) = 91\%$
 $P(S) = 90\%$

② $P(H) = 91\%$
 $P(H) = 91\%$
 $P(H) = 0.91$

[b] ① $P(S) = 90\%$
 $P(S) = 0.9$

② $P(H \cup S) = 1 - P(H \cap S)$
 $= 1 - 0.51 = 0.49$
 $P(H \cup S) = 0.49$

Home Work 1.5

Home Work 1.5

2 Events are independent or not? (10)

$$P(J \text{ AND } S) \stackrel{?}{=} P(J) * P(S)$$

For here,

$$P(J) * P(S) = 0.2 * 0.3$$

$$= 0.06 \text{ (2)} + \text{① (1)}$$

$$P(J \text{ AND } S) = 0.2 + 0.3 - 0.08$$

$$= 0.42 \text{ (2)} + \text{② (2)}$$

From ①, & ② We say that,
 These events are not independent.

Home Work 1.6

HOME WORK 1.6

[Q] If Two events are independent if and only if

$$P(X \text{ and } Y) = P(X) * P(Y)$$

[A] \Rightarrow The sum is 6.

Possibilities: $\left. \begin{array}{l} 1+5 \\ 5+1 \\ 4+2 \\ 2+4 \\ 3+3 \end{array} \right\} 5 \text{ over } 36$

Probability is $5/36$.

\Rightarrow The second die shows 5 probability is

$1/6$

$\Rightarrow P(\text{sum is 6 AND Second die shows 5})$

$1/36$

$$\text{While } P(X) * P(Y) = 5/36 * 1/6$$

Since $1/36 \neq 5/216$

So these two events are NOT INDEPENDENT

[b] Possibility of die sum is 7.

$$1+6$$

$$6+1$$

$$4+3$$

$$3+4$$

$$5+2$$

$$2+5$$

6 Possibility of 36

Probability of sum 7 is $\left(\frac{6}{36} = \frac{1}{6} \right)$.

Probability of first die shows 5 is $\frac{1}{6}$

$$P(\text{sum is 7} \& \text{first die shows 5}) = \frac{1}{36} \rightarrow (1)$$

$$P(\text{sum is 7}) * P(\text{first die shows 5}) = \frac{1}{6} * \frac{1}{6} = \frac{1}{36} \rightarrow (2)$$

From (1) & (2), both are same
So this event is independent.

Home Work 1.7

HOME WORK 1.7

1.2. Find the XT of each part (Hazardous)

State

Drilling Probability

State

Drilling Probability

Findy Oil Probability

NJ

10%

10%

TX

60%

30%

AK

30%

20%

[1] Probability of findy oil:

$$= (0.1 \times 0.1) + (0.3 \times 0.6) + (0.3 \times 0.2)$$

$$= 0.01 + 0.18 + 0.06$$

$$= 0.25$$

$$\boxed{= 25\%}$$

[2] Ex

Probability they drill in TX & find oil.

$$= \frac{0.6 \times 0.3}{0.25}$$

$$= 0.72$$

$$= 72\%$$

Home Work 1.8

Homework 1.8

$$P(\text{Success} | \text{Yes}) = \frac{P(\text{Success} \cap \text{Yes})}{P(\text{Yes})}$$

$$= \frac{P(\text{Yes} | \text{Success}) * P(\text{Success})}{P(\text{Yes})}$$

$$\begin{aligned} P(\text{Yes}) &= P(\text{Yes} | \text{Success}) * P(\text{Success}) \\ &+ P(\text{Yes} | \text{Avg.}) * P(\text{Avg.}) \\ &+ P(\text{Yes} | \text{Failure}) * P(\text{Failure}) \end{aligned}$$

$$\begin{aligned} &= (0.9 * 0.2) + (0.2 * 0.5) + (0.1 * 0.3) \\ &= 0.31 \end{aligned}$$

$$P(\text{Success} | \text{Yes}) = \frac{0.9 * 0.2}{0.31}$$

$$= 0.58$$

58%