★ Never blindly trust anything.

If you find any mistake, kindly correct it and if possible inform in our grp too.

Thank you
18BCE120.

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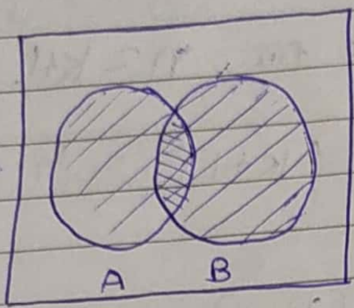
So. that If you get most recent and updated answers.

# Tutorial 1

① 



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

$= A \cup B$

$n(A \cup B) \leq n(A) + n(B)$

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

② $P \vee \neg(P \to Q)$

Ans. P.

$\cancel{P \vee \neg(P \to Q)}$

$\cancel{P \vee (\neg P \to \neg Q)}$

$\cancel{P \vee (\neg P \vee}$

$\therefore P \vee \neg(P \to Q)$

$\therefore P \vee \neg(\neg P \vee Q)$

$\therefore P \vee (P \wedge \neg Q)$

$\cancel{P \vee P \wedge \neg Q}$

$\cancel{P \wedge \neg Q}$

$\therefore (P \vee P) \wedge (P \vee \neg Q)$

$\therefore (P \vee P) \wedge (x)$

$\therefore P.$

$x \equiv (P \vee \neg Q)$

3) Relationship betn $2^{A\cup B}$ and $2^A \cup 2^B$.

$\Rightarrow$ Let $A$ & $B$ are ordinary sets
let $x \in 2^A \cup 2^B$.

$\therefore$ $x \in 2^A$ <u>or</u> $x \in 2^B$.

$\therefore$ $x \subseteq A$ <u>or</u> $x \subseteq B$

$\therefore$ $x \subseteq A \cup B$.

$\therefore$ $x \in 2^{A\cup B}$.

as $x$ is arbitery element of $2^A \cup 2^B$.

$\therefore$ $2^A \cup 2^B \subseteq 2^{A\cup B}$. for any arbitery $A$ & $B$

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∀L,L∗=(L∗)∗

# 4th question

I've started with

def.L∗=⋃i∈NLi,L0={ϵ},L1={L},Li+1={uv|u∈Li,v∈L}

then(L∗)∗=⋃i∈NL∗i,L∗0={ϵ},L∗1={L∗},L∗i+1={uv|u∈L∗i,v∈L∗}

L∗L∗0∈(L∗)∗=L∗ϵ∗=L∗ ∴L∗⊆(L∗)∗

L∗L∗0=L∗,L∗L∗1=L∗(def),L∗L∗i+1=L∗iL∗=L∗L∗ but the ∗ operator is closed under concatenation, thus, L∗L∗∈L∗∴(L∗)∗⊆L∗

∴L∗=(L∗)∗

I simply don't have an intuition on whether this attempt at a proof is correct and I would appreciate any insight about it since the subsequent problems are to show L+=(L+)+ and then to argue whether (L∗)+=(L+)∗

bezglasnaaz and 3 more users found this answer helpful

THANKS 1  3.0 (2 votes)

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$\boxed{5}$ Relationship bet$^n$ $L_1 \cdot (L_2 \cap L_3)$ and $L_1 L_2 \cap L_1 L_3$

$\Rightarrow$ String $w \in L_1 \cdot (L_2 \cap L_3)$

Let $w = xy$ , $x \in L_1$ $y \in L_2 \cap L_3$

$\therefore y \in L_2$ & $y \in L_3$

$\rightarrow L_1 \cdot (L_2 \cap L_3) \subseteq L_1 L_2 \cap L_1 L_3$

$\rightarrow L_1 L_2 \cap L_1 L_3 \subseteq L_1 \cdot (L_2 \cap L_3)$

$\Rightarrow$ Both equal. $L_1 (L_2 \cap L_3) = L_1 L_2 \cap L_1 L_3$

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⑥ $n \geq 0.$ $\sum_{i=1}^{n} i^2 = n(n+1)(2n+1)/6$

Basic. $i=0.$ (LHS) = 0. , RHS = 0.

LHS = RHS.

Assume that this is true for $n = k$.

$$\sum_{i=1}^{k} i^2 = k(k+1)(2k+1)/6.$$

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prove that it is true for $n = k+1$.

$$\sum_{i=1}^{k+1} i^2 = \sum_{i=1}^{k} i^2 + (k+1)^2$$

$$= \frac{k(k+1)(2k+1)}{6} + (k+1)^2$$

$$= \frac{(k+1)(k+2)(2(k+1)+1)}{6}.$$

<u>proved</u>

$\boxed{7}$ $\Longrightarrow$ $x^r$ is reverse.

$\longrightarrow$ $x = a$

Basic LHS = 1

RHS = 1

LHS = RHS

Assume for $|x^r| = K$

$x = a^K$

$|(a^K)^r| = |a^K|$

K is length.

$n = k+1$.

$$a^{k+1} = |a^k \cdot a|$$

$$= |a^k| + |a|$$

$$= (a^k)^n + (a^n)$$

$$\therefore |a^{k+1}| = (a^{k+1})^n$$

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8 Recursive definition..

a. The set N of all Natural numbers

→ Rec. def. for set of all Natural number will be the set of containing all natural numbers

→ 1. min value / Basic condition / Min string

$1 \in S$.

→ 2. For any x, $x \in N$. then $x+1 \in N$.

$x = \{1, 2, 3 \ldots\}$

→ 3. No other element will belong to the set unless it satisfy condition 1 & 2

Write in proper formate like que. 9

b. 1. $x = 7$
2. $x+7$, $x-7 \in S$
3. No other element will belong to set unless satisfy cond. 1 & 2

c. 1. $00 \in U$
2. $1x \in U$
$x1 \in U$
$0x \in U$
$x0 \in U$
3. No other ele...