Above all A = 3 @ P(A) = P(B).

Date	
100 Am	$\Rightarrow f^{-1}(y) \in f^{-1}(S), f^{-1}(y) \in f^{-1}(T)$
From arbitrariness of y,	f-'(SnT) ⊆ f-'(S) ∩ f-'(T) @
$\forall x \in f^{-1}(s) \cap f^{-1}(\tau), x \in f^{-1}(s)$), $x \in f^{-1}(\tau) \Rightarrow f(x) \in S$, $f(x) \in T$
⇒ f(x) ∈ S∩T ⇒ x ∈ f-'(SI	(71
From arbitrariness of x ,	f"(s) ∩ f"(t) ⊆ f"(SNT) @
From OO , $f'(SNT) = f'(SNT)$	s) n f ⁻¹ (7) (A-2) 1 4 4 4 4 4
E. et A. c.	eran Subbah. Can
Q2. (1) (B-A)U(C-A) = (B)A)U(C	(definition)
< (BUC)∩(BU	JĀ) n (C UĀ) n (Ā UĀ)
= (BUC) nĀ	(distributive)
= (BUC)- MA	(definition)
(2) (AnB) n(Bnc) n (Anc)	Manatha Shu Ka Ay -
= (ANB)n(BUZ)NANC)	(De Morgan)
= ANBNANC N (BUE)	(commutative, associative)
= ANBNCN(BUE)	(idemponent)
= (ANBACAB) U(ANBACAC	(distributive)
= (ANCNØ) U(ANBNØ)	(commutative, complement)
= Ø U Ø	
= Ø	(identity)
**** [48] 1 142 La	
Q3. A⊆B ⇒ P(A) ⊆ P(B). ∀C∈P(
hence $C \in \mathcal{P}(B)$. From arbitrar	iness of C , $P(A) \subseteq P(B)$.
$P(A) \subseteq P(B) \Rightarrow A \subseteq B, \forall x \in A$	$\{x\} \in \mathcal{P}(A)$, since $\mathcal{P}(A) \subseteq \mathcal{P}(B)$, $\{x\} \in \mathcal{P}(B)$
hence XEB. From arbi-braniness	
90. 92 Sept. 450	

Above all, $A \subseteq B \Leftrightarrow \mathcal{P}(A) \subseteq \mathcal{P}(B)$.

Q4. (a) $f_1(x)$ are $\Theta(g(x)) \Rightarrow \exists c_1, c_2, c_1 |g(x)| \leq |f_1(x)| \leq c_2 |g(x)|$ when x > M for $f_2(x)$ are $\Theta(g(x)) \Rightarrow \exists c_3, c_4, c_4 |g(x)| \leq |f_4(x)| \leq c_4 |g(x)|$ when x > M.

Take $N = \max(N_1, N_2)$, when x > M. $C_1[g(x)] \leq |f_1(x)| \leq c_4 |g(x)|$, $c_4[g(x)] \leq |f_4(x)| \leq c_4 |g(x)|$ Since $f_1: |R \rightarrow |R^{\dagger}, f_2: |R \rightarrow |R^{\dagger}|$ $(c_1 + c_4) |g(x)| \leq |f_4(x)| + |f_4(x)| = |f_4(x) + |f_4(x)| = |f_4(x)| \leq |f_4(x)| \leq |f_4(x)| \leq |f_4(x)|$ Hence $\exists c_4 = c_4 + c_4, c_5 = c_5 + c_4, s_4 + c_4 = |f_4(x)| \leq |f_4(x)| \leq |f_4(x)| \leq |f_4(x)|$ $f_1 + f_2 \text{ is } \Theta(g(x)).$

- (b) Disapr Disprove. $f_1(x) = x$, $f_2(x) = -x$, g(x) = x. f_1 , f_2 are both $\Theta(g(x))$. $f_1 + f_2 = 0$ is not $\Theta(g(x))$.
- QS. (a) Disprove. $f_1(x) = x$, $f_2(x) = x$, g(x) = x. f_1 , f_2 are both $\Theta(g)$, $(f_1 - f_2)(x) = 0$ is not $\Theta(g(x))$
 - (b) $f_i(x)$ is $\Theta(g(x)) \Rightarrow \exists c_i, c_i > 0$, s.t. when $x > N_i$, $c_i |g(x)| \le |f_i(x)| \le |c_i|g(x)|$. $f_i(x)$ is $\Theta(g(x)) \Rightarrow \exists c_i, c_i > 0$, s.t. when $x > N_i$, $c_i |g(x)| \le |f_i(x)| \le |c_i|g(x)|$.

 Then $c_i c_i |g(x)| \le |f_i f_i(x)| \le |c_i|g(x)|$.

 Hence, $\exists c_i = c_i c_i$, $c_i = c_i c_i > 0$, s.t. when $x > N = \max(N_i, N_i)$, $c_i |g^2(x)| \le |f_i f_i(x)| \le |c_i|g^2(x)|$.

 (f.f.) (x) is $\Theta(g^2(x))$.
- Q6. Disprove. If there exist infinite set A, $|A| < |Z^{\dagger}|$. We can count list elements of A one by one, this cause a mapping from Z^{\dagger} to A and the map is bijective. Hence $|A| = |Z^{\dagger}|$, which means it don't doesn't exist such a set.

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Q7. Suppose x= 1x1+y, 0=y<1. Then discuss by cases.
      0 0 € y < 1/3
         LHS = [3x] = [3[x] + 3y] = 3[x] + [3y] = 3[x]
          [x+=] = [x] + [y+=] = [x]
          Lx+=] = [x] + [y+=] = [x]
         RHS = [x] + [x+\f] + [x+\f] = 3 [x] = LHS
 Table @ 1 < y < 3. We have the water with the
        LHS = [3x] = 3[x] + [3y] = 3[x] + 1
          [x++]=[x]+[y++]=[x] + x=10 + 10 model type (a)
       [x+\frac{2}{3}] = [x] + [y+\frac{2}{3}] = [x] + 1
         RHS = [\times] + [\times] + ([\times] + i) = 3[\times] + i = LHS
        3 = < y<1
          LHS = [3x] = 3[x] + [3y] = 3[x] +2
     [x+=]=(x)+ Ly+=]=(x)+1
     |x+\frac{1}{2}| = |x| + |y+\frac{1}{2}| = |x| + |x|
          RHS = Lx) + (Lx)+1)+(Lx)+1)= 3[x]+2= LHS
       Hence, the equation holds.
                                  6. (00/0) & 1 (3.4.) 0) = 6. (000).
      k+- (k-1)+= 4k3-6k2+4k-1 and (1) in (1) in (1)
Q8
     \sum_{k=1}^{\infty} \left[ k^4 - (k-1)^4 \right] = 4 \sum_{k=1}^{\infty} k^3 - 6 \sum_{k=1}^{\infty} k^2 + 4 \sum_{k=1}^{\infty} k - \sum_{k=1}^{\infty} 1
   n^{4} = 4 \sum_{k=1}^{n} k^{3} - 6 \frac{2n^{3} + 3n^{2} + n}{6} + 4 \cdot \frac{n^{2} + n}{2} - n
4 \sum_{k=1}^{n} k^{3} = n^{4} + 6 \cdot \frac{2n^{3} + 3n^{2} + n}{6} - 4 \cdot \frac{n^{2} + n}{2} + n
    masm with= n++2n3+3n+n-2n2-2n+nit & qua set has A
                it don't show to prive such a con the things of
         \sum_{k=1}^{n} k^{3} = \frac{1}{4} n^{2} (n+1)^{2}
```

- Q9. (a) Countable. Number of students in CS201 is finite, its power set is also finite.
 - (b) Countable. We can list them as follows. Hence is countable. $(0,0) \rightarrow (0,1) \quad (0,2) \quad \cdots$ $(1,0) \leftarrow (1,1) \leftarrow (1,2)$ $(2,0) \leftarrow (2,1)$
 - (c) Uncountable, $A = \{(1,b) \mid b \in |R\}$, $A \subseteq \{(a,b) \mid a \in W, b \in |R\}$,

 so $|A| \le |\{(a,b) \mid a \in W, b \in |R\}|$ $f \colon A \to |R|$, f(1,b) = b is bijective, so |A| = |R|

Then $|R| \le |\{(a,b)|a \in W, b \in |R|\}|$, it is uncountable.

- Q10. If we list (m,n) with increasing of the sum of m,n, we get (1,1), (1,2), (2,1), (1,3), (2,2), (3,1), ...

 And f(m,n) would be $1,2,3,4,5,6,\cdots$ Hence $f: \mathbb{Z}^+ \times \mathbb{Z}^+ \to \mathbb{Z}^+$ is one-to-one and onto.
- Q11. |A| = |B| means there exist function $f: A \rightarrow B$ is bijective. $|B| = |C| \Rightarrow \exists g: B \rightarrow C$ is bijective. $g \circ f: A \rightarrow C$ is bijective, so |A| = |C|.
- Q12. f(x) is $\theta(g(x)) \Rightarrow \exists c_1, c_2 > 0$, s.t. when x > M, $c_1[g(x)] \leq |f(x)| \leq c_2 |g(x)|$ g(x) is $\theta(h(x)) \Rightarrow \exists c_3, c_4 > 0$, s.t. when $x > N_2$, $c_3[h(x)] \leq |g(x)| \leq |g(x)| \leq |c_4|h(x)|$ When $x > N = \max(N_1, N_2)$, $c_1c_3[h(x)] \leq c_1[g(x)] \leq |f(x)| \leq c_2[g(x)] \leq c_3c_4[h(x)]$ Hence, $\exists c_1 = c_1c_3$, $c_2 = c_3c_4$, s.t. when x > N, $c_1[h(x)] \leq |f(x)| \leq c_2[h(x)]$, which means f(x) is $\theta(h(x))$

Secretary there is the second of the second		loop is n times, the multiplications and additions
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If $(x,y) = (x,y) = ($	60103,	in the marriable Artholibers] A & & (a,b) demo
Then IP & (and now begas) it is inconstable. If we get (and extended of the sum of min.) We get (and that) (and the second of the sum of min.) Ind f(min) would be treast, the second and onto. Find of the second the reast, the second and onto. Find the more than exist function to APR is bitective. Example of Processes we Marked the second of the		
Thus $ P \leq (\alpha, \omega) \text{ so } W \text{ be } P $ it is uncountable. If we get $(\alpha, \alpha) \in \mathbb{R}^n$ increasing of the sum of m, n , we get $(\alpha, 1) \in (1, \omega)$, $(\alpha, 1) \in (1, 2) \in (1, \omega)$, $(\beta, 1) \in (2, \omega)$, and $f(m, \alpha) \text{ sopally be } 1 \in \mathbb{R}^3$, $w_1 \in [6]$, where $f: \mathbb{Z}^n \times \mathbb{Z}^d = \mathbb{Z}^d$ is one-to-one and onto. If $ P = P = 2^d$ is one-to-one and onto. $ P = P = 2^d$ is one-to-one and onto. $ P = P = 2^d$ is one-to-one and onto. $ P = P $		
If we get (ma) with increasing of the sum of min. We get (mil) (ma), (mil) (mil) (mil) (mil), (mil) (mil), (mil) (mil), (mil) (mil),		
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we get (11), (112), (21), (13), (21), (31), (31), (32	. N. M to	a If see set towns with increasing of the sum
Figure 7: $Z^7 \times Z^7 - Z^9$ is one-to-one and onto. If $I = IEI$ mount then and that $I : A > B$ is bijective. $I = IEI$ mount then and that $I : A > B$ is bijective. $I = IEI$ is objective, so $IEI = IEI$. $I : IEI :$		
Figure 7: $Z^{2} \times Z^{4} \rightarrow Z^{2}$ is one-to-one and onto. [4] = [E] mount there, exist fine than $+: A \Rightarrow B$ is bijective. [5] = [6] $\Rightarrow \exists q B \Rightarrow i$ is objective, we $ A = G $. [6] $\Rightarrow \exists G \Rightarrow $		and flower) would be 1,2,3,4,5,6,
If $i=iE_1$ maps there, exist fine than $i:A>B$ is bijective. $E=iG: \Rightarrow \exists g:B>G$ is algebra. $g:A=G$ is bijective, we $M=iG!$. $g:BGG \Rightarrow \exists G:G>G$ or when $g:G:G=G$ is algorable $G:G=G=G$. If $g:GGG \Rightarrow \exists G:G>G$ or when $g:G:G=G=G=G=G$. If $g:GGG \Rightarrow \exists G:G>G$ or when $g:G:G=G=G=G=G=G=G=G=G=G=G=G=G=G=G=G=G=G=$	atrio	
$E = 0$ $\Rightarrow \exists q : P \Rightarrow i = 0$ of a cotive. Where $A \rightarrow C$ is below this, we $M = C $. The interpolation of the in	1.57	
Esc. $\Rightarrow \exists q \cdot P \Rightarrow C$ is objective. Where $A \Rightarrow C$ is believed as so $M \Rightarrow C$! If $B \in C \cap C$ is the second as $C \cap C \cap C$ is $C \cap C$ is C is	bijective,	[1] = [2] means there exist frontion +: A = B is
407: $A \rightarrow C$ is bijective, so $M = C $. (i) $\Re(gg) \Rightarrow \exists G, G > 0$ so when $x \in C$. $G[ggo] \leq Gge] \leq G[ggo]$ (ii) $\Re(gg) \Rightarrow \exists G, G > 0$ so when $x \in C$. $G[ggo] \leq Gge] \leq G[ggo]$		
$ x \leq \mathcal{O}(n) \Rightarrow \exists c_1 \leq x > 0 \leq x \leq hcn \times x \leq c_1 g(n) \leq f(n) \leq c_1 g(n) $ $ x \leq \mathcal{O}(h(n) \Rightarrow \exists c_1 \leq x > 0 \leq x \leq hcn \times x \leq x \leq c_1 h(n) \leq g(n) \leq c_1 h(n) $		
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