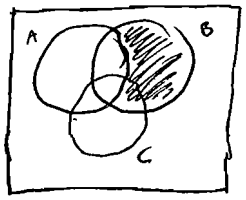
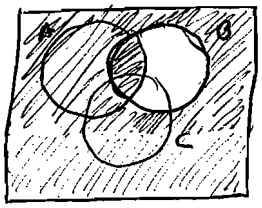
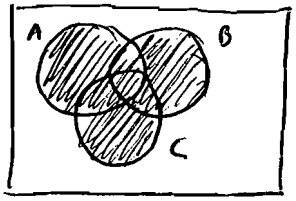
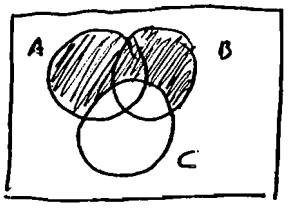
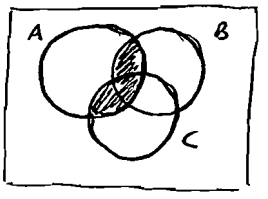
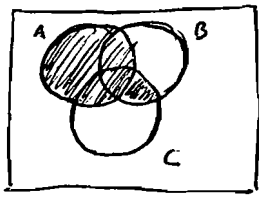
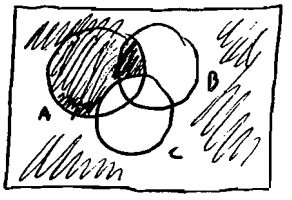
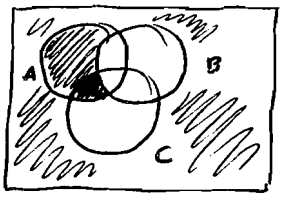
No. 1.2

Date /

Problem	Ans	Reason
1	a)  b)  c)  d) 	
2	a) $A \cap C' = \{x\}$ b) $A \cup C' = \{x, y, z, w\}$ c) $A \cup (B \cap C) = \{x, y, z, v\}$ d) $(B \cap C)' = \{w, x, z\}$	
3	a) $A \cup C = \{x, y, z, v\}$ b) $A \cap B = \{y\}$ c) $A \cup B = \{x, y, z, v, w\}$ d) $B \cap C = \{v, y\}$	
4	a) T b) T c) F d) T	
5	a) F b) T c) F d) T	

Problem	Ans	Reason
6	a) $A \cap B \cap C$	
	b) $A \cap B' \cap C'$	
	c) $(A \cap B)' \cap C$	
7	a) $A' \cap B \cap C$	
	b) $(B \cap A' \cap C') \cup (C \cap A' \cap B')$	
	c) $(A \cup B \cup C)' \cup (B \cap C)$	
8	a) T	
	b) T	
	c) F	 $\neq$ 
9	a) F	
	b) F	
	c) T	In fact $A' \cap B' = (A \cup B)'$
	d) F	
	e) F	
	f) T	Since $(A \cap B)' = A' \cup B'$

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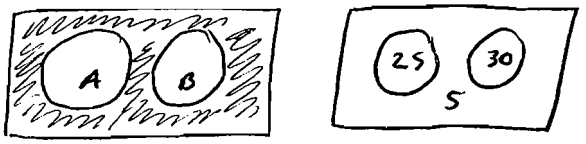
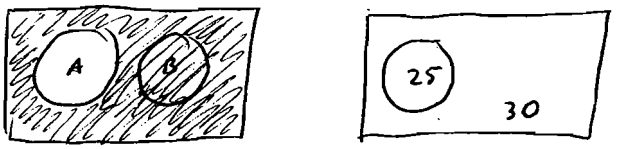
Problems	Ans	Reason
10	a) F b) F c) F d) T e) T	
11	5	 $60 - 25 - 30 = 5$
12	30	 $55 - 25 = 30$
13	60	 $n(U) = n(A) + n(A')$ $= 25 + 40$ $= 65$ $n(B) = n(U) - n(B')$ $= 65 - 30$ $= 35$ $n(A \cup B) = n(A) + n(B)$ $= 25 + 35$ $= 60$

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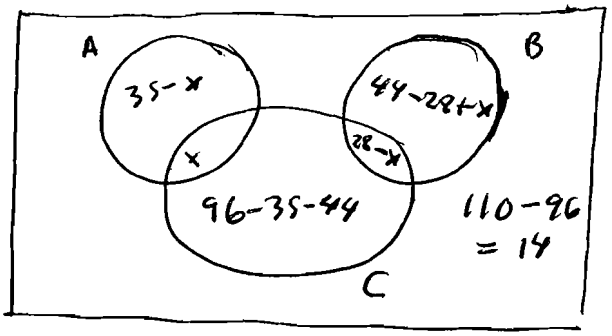
Problem	Ans	Reason
14	120	$n(X \times Y \times Z) = n(X)\, n(Y)\, n(Z)$ $n(x)\, n(y) = 24 = 3 \times 8$ $n(y)\, n(z) = 40 = 5 \times 8$ $n(x)\, n(z) = 15 = 3 \times 5$ $n(x)^2\, n(y)^2\, n(z)^2 = 3^2 \times 5^2 \times 8^2$ $n(x)\, n(y)\, n(z) = 3 \times 5 \times 8$ $= 120$
15	a) N b) Y c) N d) Y	$A \cup B = \{a, b, c, 2, 3\}$ $C \cap B' = \{1\}$
16	(a) and (c)	
17	$A \times B = \begin{Bmatrix} 1v & 1w \\ 2v & 2w \\ 3v & 3w \end{Bmatrix}$ $A \times \{v\} = \begin{Bmatrix} 1v \\ 2v \\ 3v \end{Bmatrix}$ $A \times \{w\} = \begin{Bmatrix} 1w \\ 2w \\ 3w \end{Bmatrix}$	
18	$n(P_2) = 25$	$n(P_2) = 5\, n(P_1)$ $n(P_3) = 2\, n(P_1)$ $40 = n(P_1) + n(P_2) + n(P_3)$ $= n(P_1) + 5n(P_1) + 2n(P_1)$ $= 8\, n(P_1)$ $n(P_1) = 40/8 = 5$ $n(P_2) = 5^2 = 25$

Problem	Ans	Reason
19	a) $n(A\times B)=10$ b) $n(B\times B\times B)=8$	$n(A)=5 \quad n(B)=2$ $n(A\times B)=n(A)\,n(B)$ $=5\times 2$ $=10$ $n(B\times B\times B)=n(B)\,n(B)\,n(B)$ $=2\times 2\times 2$ $=8$
20	(c) is True	$A\neq\phi, \quad B\neq\phi$ so $n(A)\geq 1, \quad n(B)\geq 1$
21	15	$3\times 5=15$
22	$n(C)=45$	 $n(C)=96-35-44+28$ $=124-79$ $=45$
23	4 ways to select B if $n(B)=4$ 6 ways to select B if $n(B)=5$	
24	$A\times B\times C$ and $B\times B\times B$ have same number of elements since $5\times 10\times 20=10\times 10\times 10$	

Problem	Ans	Reason

25

$n(X_1) = 4$

$n(X_2) = 9$

$n(X_3) = 6$

X_1	X_2	X_3
ggg	rgg	rrg
ggg	rgg	rrg
ggg	rgg	rgr
ggg	grg	rgr
	grg	grr
	grg	grr
	ggr	
	ggr	
	ggr	

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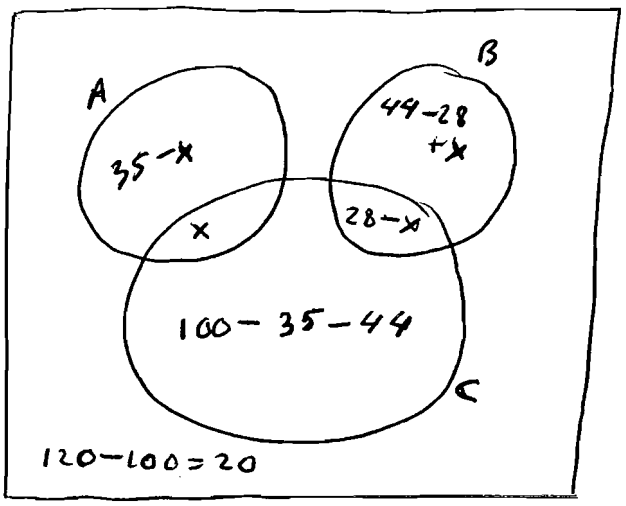
$n(C') = 71$

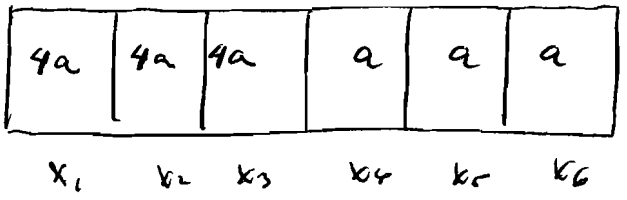


$20 + 35 - x + 44 - 28 + x$

$= 35 + 44 - 8$

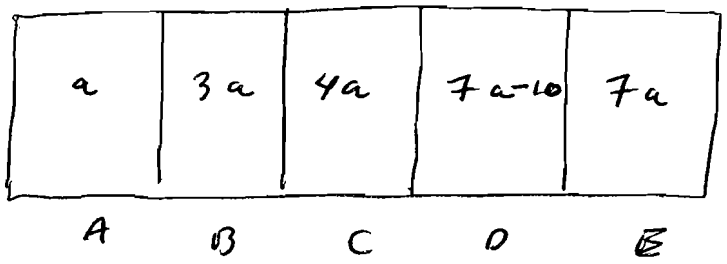
$= 79 - 8 = 71$

Problem	Ans	Reason
27	$n(X_1) = 10$ $n(X_2) = 5$ $n(X_3) = 25$	$n(X_1) = 2n(X_2)$ $n(X_3) = 5n(X_2)$ $40 = n(X_1) + n(X_2) + n(X_3)$ $= 2n(X_2) + n(X_2) + 5n(X_2)$ $= 8n(X_2)$ $n(X_2) = 5$ $n(X_1) = 2 \times 5 = 10$ $n(X_3) = 5 \times 5 = 25$
28	$n(X_1) = 5$	$n(X_2) = 2n(X_1)$ $n(X_3) = 3n(X_2) = 3 \times 2 \times n(X_1)$ $= 6n(X_1)$ $45 = n(X_1) + n(X_2) + n(X_3)$ $= n(X_1) + 2n(X_1) + 6n(X_1)$ $= 9n(X_1)$ $n(X_1) = 45/9 = 5$
29	$n(X_1) = 16$	Write $a = n(X_4)$



$60 = a + a + a + 4a + 4a + 4a$
$= a(1 + 1 + 1 + 4 + 4 + 4)$
$= 15a$
$a = 60/15 = 4$
$n(X_1) = 4a = 4 \times 4 = 16$

Problem	Ans	Reason
30	True	$A \times B = \{(a,b) : a \in A \text{ and } b \in B\}$ $\forall a \in A_j$ a in exactly one of A_1, A_2 $\forall b \in B_j$ b in exactly one of B_1, B_2
31	$n(O) = 25$	Write $a = n(A)$



$100 = a + 3a + 4a + 7a - 10 + 7a$

$110 = 22a$

$a = 110/22 = \frac{11 \times 10}{11 \times 2} = \frac{10}{2} = 5$

$7a - 10 = 35 - 10 = 25$