1. Review

No. 1.R

Date

Problem 1

(a) $A \cap B = \{2, x\}$

(b) $A \cup B = \{1, 2, 3, 4, u, v, x, y, z\}$

(c) $(A \cap B) \cup C = \{2, 3, x, z\}$

$\mathcal{U}$	1	2	3	4	u	v	x	y	z
A	•	•	•		•	•	•		•
B		•		•			•	•	
$A \cap B$		•					•		
$A \cup B$	•	•	•	•	•	•	•	•	•
C		•	•				•		•
$(A \cap B) \cup C$		•	•				•		•

Problem 2

(a) T — $A' \cap B' \subset A' \cup B' = (A \cap B)'$

(b) T

(c) F — take $\mathcal{U} \neq \phi$, $A = \mathcal{U}$, $B = \mathcal{U}$

(d) F — take $\mathcal{U} \neq \phi$, $A = \mathcal{U}$, $B = \phi$

Problem 3

(a) $A \cap (B \cup C) = \{m, p, a\}$

(b) $A \cup (B \cap C) = \{k, m, p, a, y, r\}$

$\mathcal{U}$	k	m	p	a	y	z	n	r	g	w
A	•	•	•	•	•					
B			•	•		•	•	•		
C		•						•	•	•
$B \cup C$		•	•	•		•	•	•	•	•
$A \cap (B \cup C)$		•	•	•						
$B \cap C$								•		
$A \cup (B \cap C)$	•	•	•	•	•			•		

Problem 4

$n((A \cup B') \times B) = 10$

$\mathcal{U}$	a	b	c	d	e	f
A	•			•	•	
B		•		•		
B'	•		•		•	•
$A \cup B'$	•		•	•	•	•

$n(A \cup B') = 5$ $\quad 5 \times 2 = 10$

Problem	Ans	Reason

5 $\{1,4\} \times \{1,4\}$ View $U = \{1, x, 4, z\}$

	1	x	4	z
1	✓	✓	✓	
x				
4	✓	✓	✓	
z	✓	✓	✓	

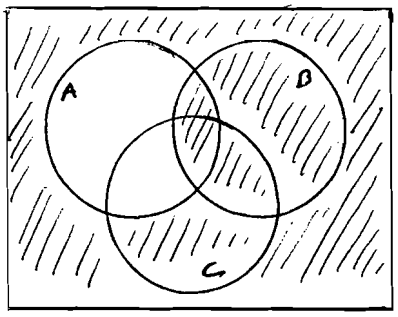
each dot reps element of $A \times B$

each ✓ reps element of $B \times A$

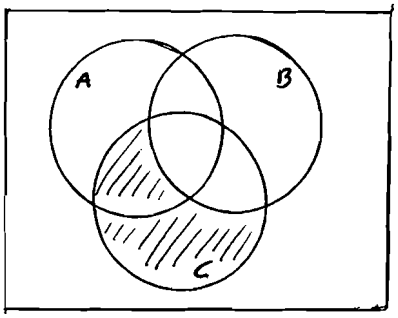
the diagram shows

$(A \times B) \cap (B \times A) = \{1,4\} \times \{1,4\}$

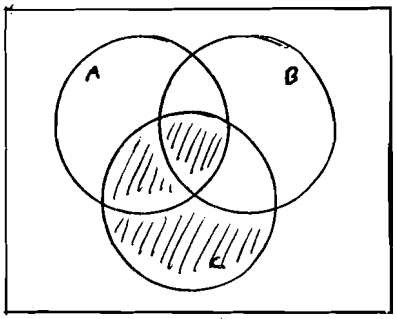
6 (a)

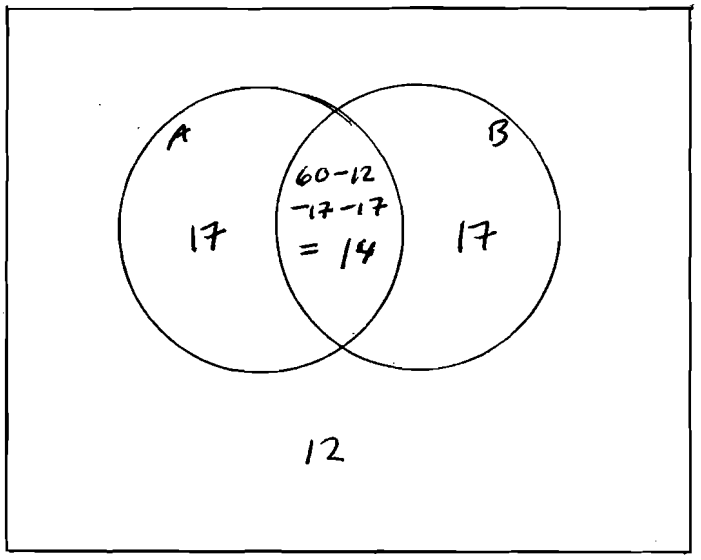
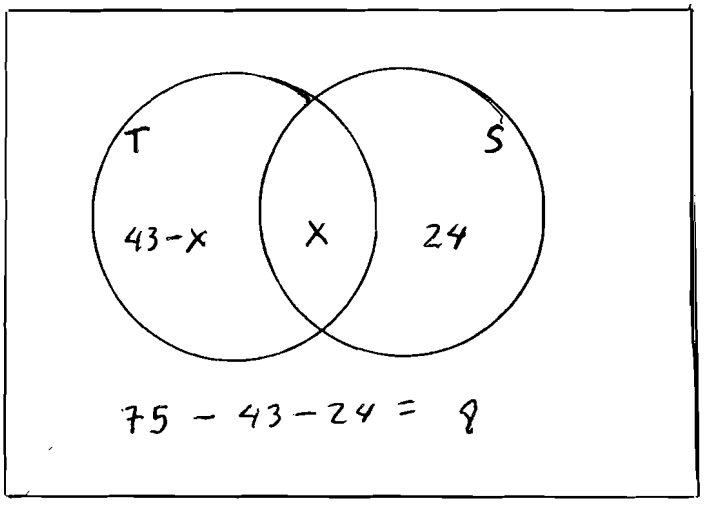


(b)



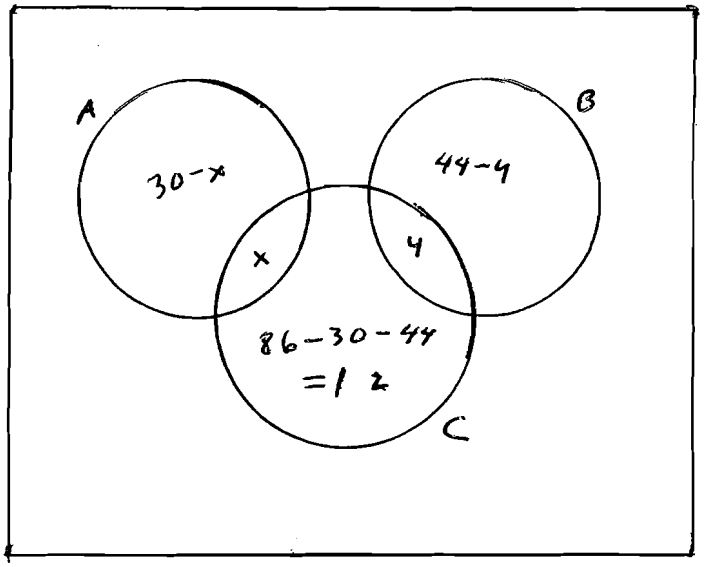
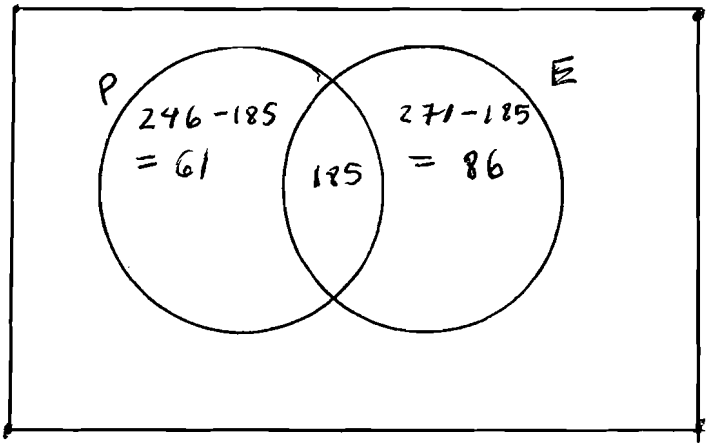
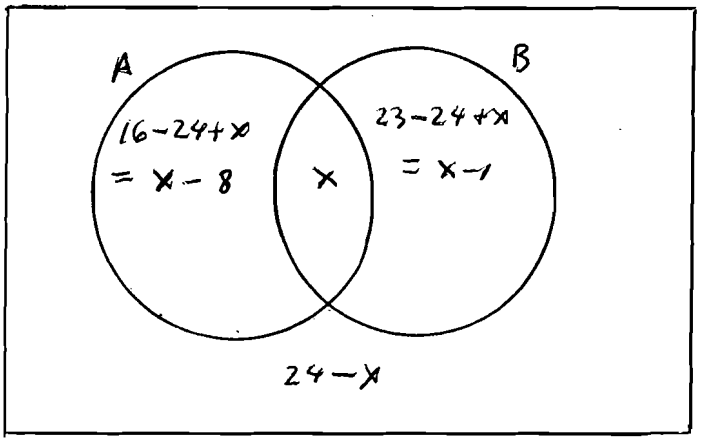
(c)



Problem	Ans	Reason
7	240	$n(F)\,n(G) = 60 = 12 \times 5$ $n(G)\,n(H) = 20 = 5 \times 4$ $n(F)\,n(H) = 48 = 12 \times 4$ $n(F)^2 \times n(G)^2 \times n(H)^2 = 12^2 5^2 4^2$ $n(F)\,n(G)\,n(H) = 12 \times 5 \times 4$ $= 240$
8	$n(A \cap B) = 14$ $n(A \cup B) = 48$	 $17 + 14 + 17 = 48$
9	(a) X cannot be det (b) can be det to be 8	

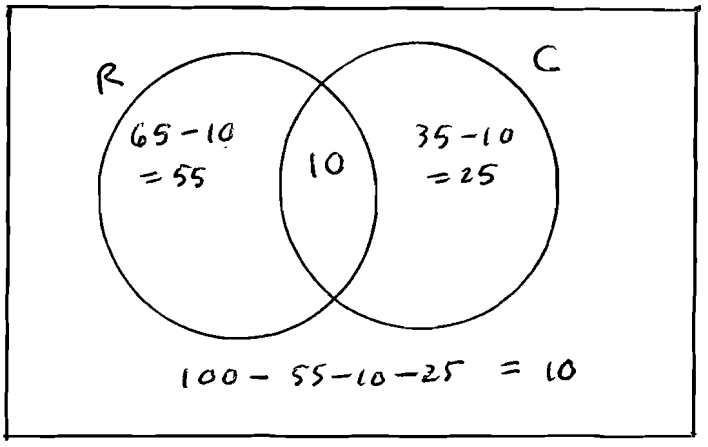
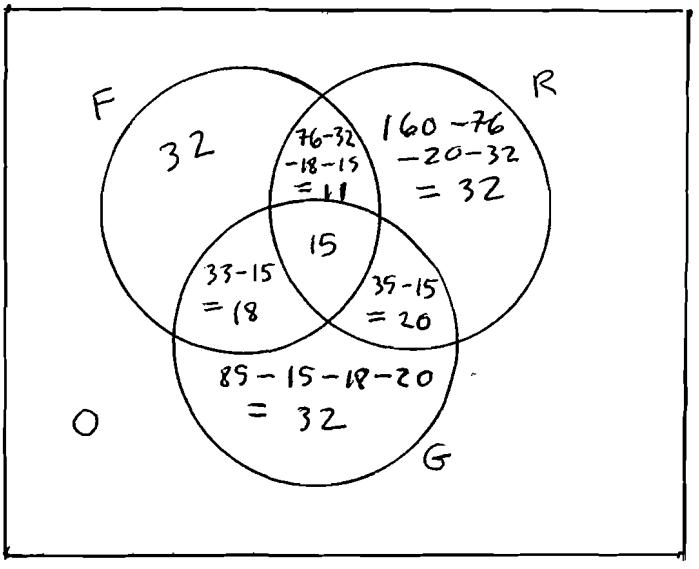
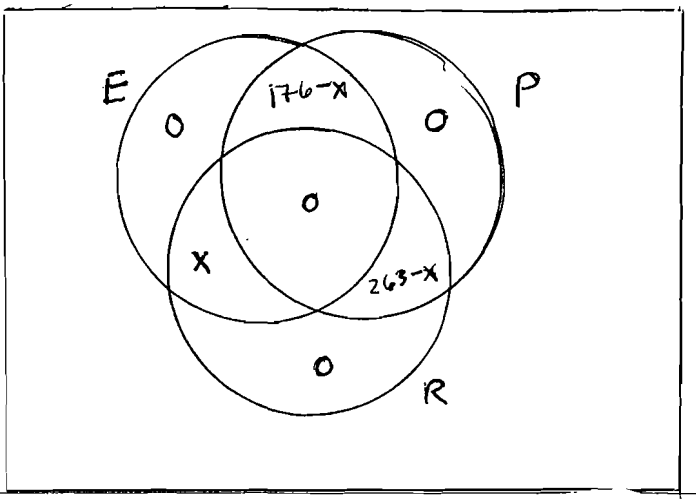
No. 1. R

Date 4

Problem	Ans	Reason
10	12	
11	147	 61 + 86 = 147
12	9	 18 = x-8+x+x-1 = 3x-9 so x = 9

No. 1, R

Date 5

Problem	Ans	Reason
13	55	
14	(a) 78 (b) 11	
15	139	

$32 + 11 + 15 + 20 = 78$

$161 = 176 - x + 263 - x$

$x = 139$

Problem	Ans	Reason
16	5	

X_1	X_2	X_3
n	$3n$	$12n$

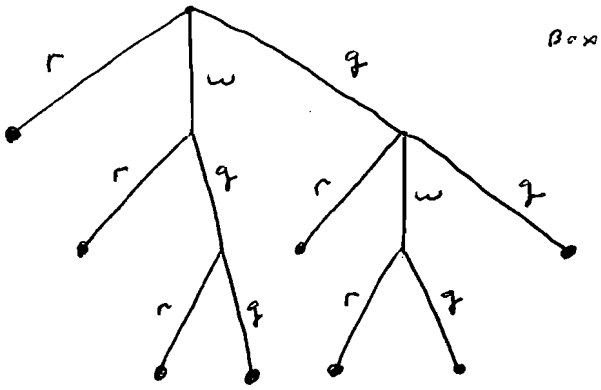
Let $n = n(X_1)$

$$80 = n + 3n + 12n = 16n$$

$$n = 5$$

17

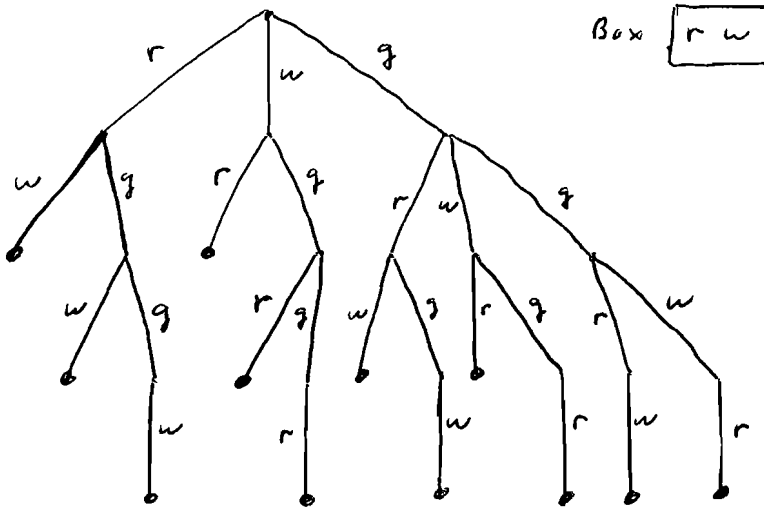
r
wr
wgr
wgg
gr
gwr
gwg
gg



Box rrrwgg

18

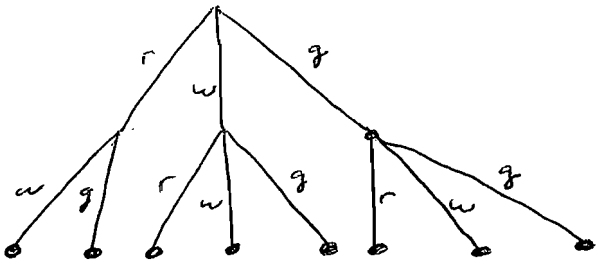
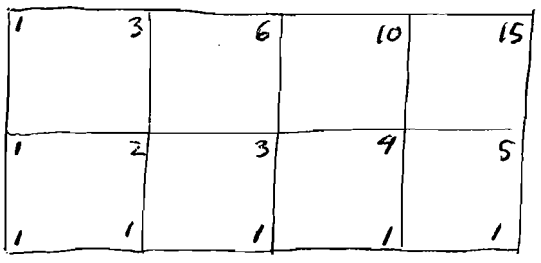
rw
rgw
rggw
wr
wgr
wggr
grw
grgw
gwr
gwgr
ggrw
ggwr



Box rwgg

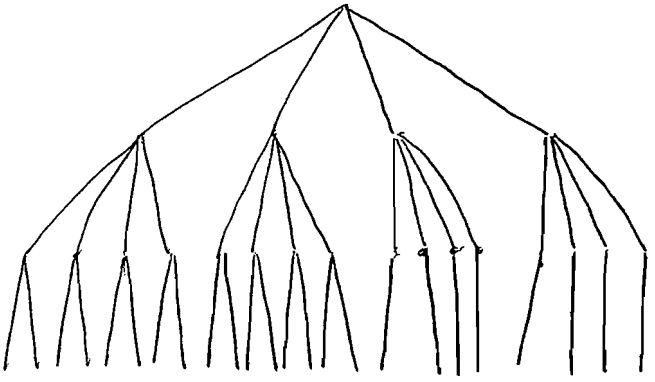
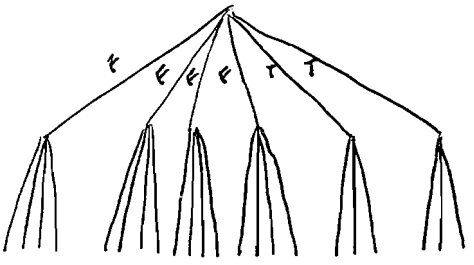
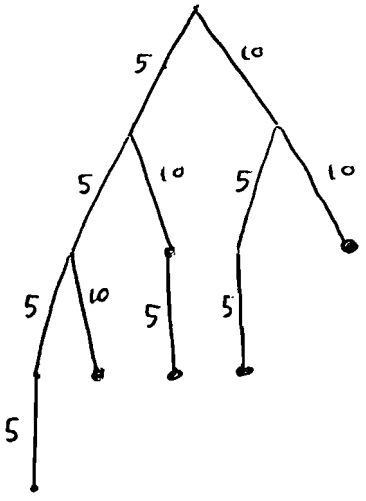
No. 1.R

Date 7

Problem	Ans	Reason
19	rw rg wr ww wg gr gw gg	Box [r wgg] 
20	(a) 360 (b) 60 (c) 162	$5\times4\times6\times3 = 360$ $5\times4\times1\times3 = 60$ $5\times6\times3 + 4\times6\times3 = 90+72 = 162$
21	210	$7\times6\times5 = 210$
22	96	$5\times4\times3\times2 - 4\times3\times2\times1 = 120-24 = 96$
23	60	$3\times4\times5 = 60$
24	222 343	$7\times6 + 6\times6\times5 = 42+180 = 222$ $7\times7 + 6\times7\times7 = 49+294 = 343$
25	15	

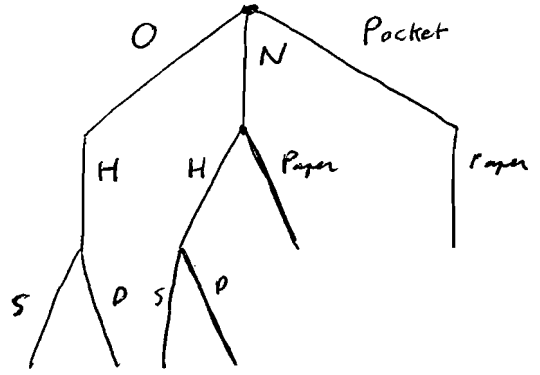
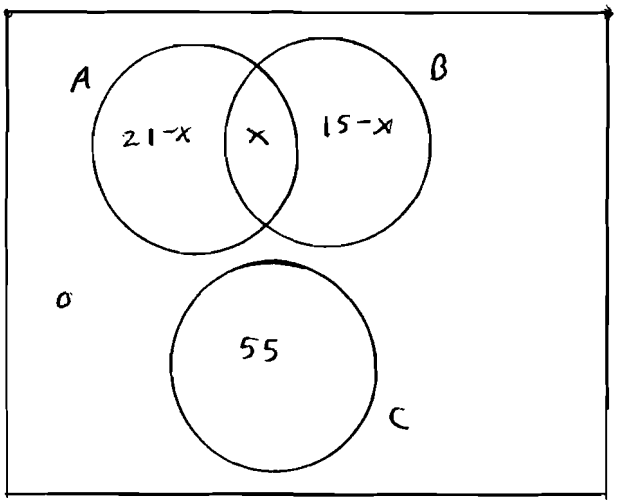
No. 1.R

Date 8

Problem	Ans	Reason
26	76800	$10 \times 24 \times 16 \times 20 = 76800$
27	24	 design, upholstery, wood
28	22	$4 \times 4 + 2 \times 3 = 16 + 6 = 22$  ica, airline
29	The schedules correspond to the paths in the tree diagram, from the top to a leaf. There are 5 schedules.	

No. 1. R

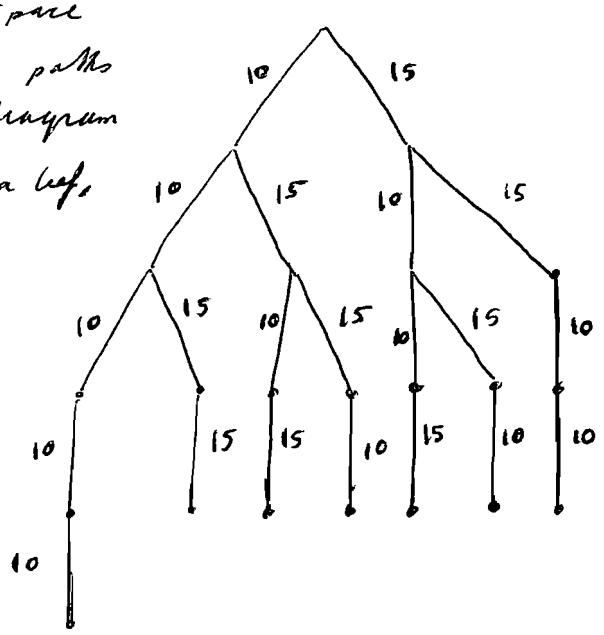
Date 9

Problem	Ans	Reason
30		 size cover editum
31	$n(A \cap B) = 6$	 $95 = 21-x+x+15-x+55$ $x = 6$
32	28800	$L - N - N_1 N_2 N_3 N_4$

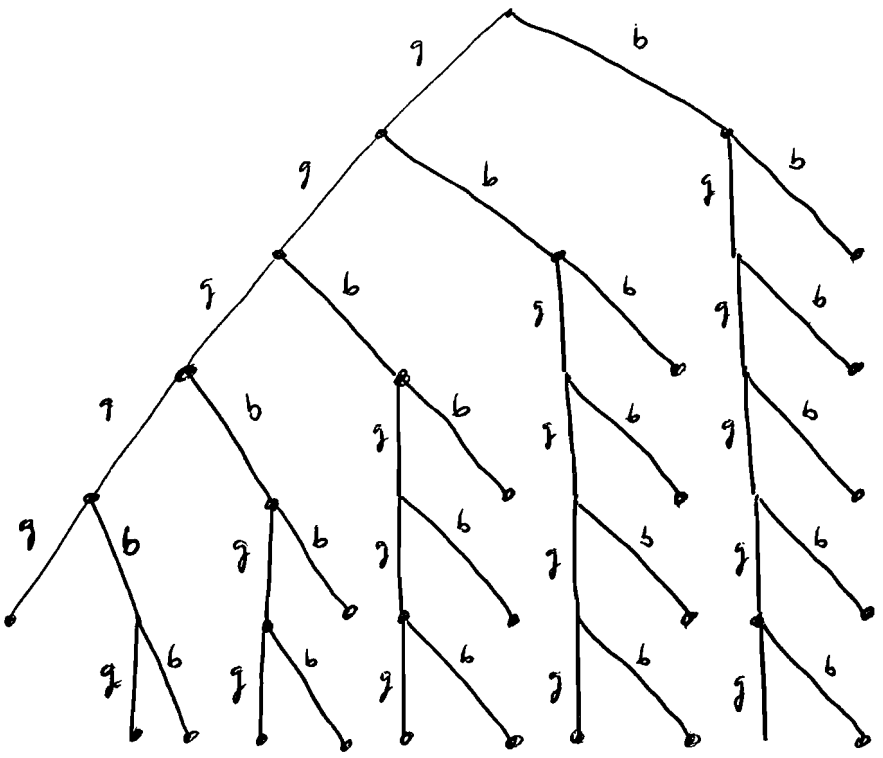
L	N	$N_1 N_2$	$N_3 N_4$
insp	place of manuf.	month	day
15	8	12	20

$15 \times 8 \times 12 \times 20 = 28800$

Problem	Ans	Reasm
33	The sample space consists of the paths in the tree diagram from the top to a leaf. 7 elements	



4	21	



Sample space consists of the paths in the tree diagram from the top to a leaf.

Problem	Ans	Reason
35	The problem is meaningless as stated,	

Since $X_1 \cap X_2 \neq \phi$.

If we redefine X_1, X_2 by

$$X_1 = \{ n : n \in X, \ n \text{ is a multiple of } 2 \}$$

$$X_2 = \{ n : n \in X, \ n \text{ is a multiple of } 3 \}$$

Then the solution is

$$X = \{ 2, 3, 4, 8, 9, 10, 14, 15, 16, 20 \}.$$

In this case

$$X_1 = \{ 2, 4, 8, 10, 14, 16, 20 \}$$

$$X_2 = \{ 3, 9, 15 \}$$

36	180	The number of nonempty subsets of $\{L, B, S, T\}$ is 15. $15 \times 3 \times 2 \times 2 = 180$