1. (b) Since $x^2+1=0$, gives $x^2=-1 \Rightarrow x=\pm i$

$\therefore$ x is not real but x is real (given)

$\therefore$ No value of x is possible

2. (b) $B\cap C=\{4\}$, $\therefore A\cup(B\cap C)=\{1,2,3,4\}$.

3. (a) $A\cap B=\{2,3,4,8,10\}\cap\{3,4,5,10,12\}$

$=\{3,4,10\}$, $A\cap C=\{4\}$.

$\therefore (A\cap B)\cup(A\cap C)=\{3,4,10\}$.

4. (c) $A\cap(A\cup B)'=A\cap(A'\cap B')$, $(\because (A\cup B)'=A'\cap B')$

$=(A\cap A')\cap B'$, (by associative law)

$=\phi\cap B'$, $(\because A\cap A'=\phi)$

$=\phi$.

5. (d) It is obvious.

6. (c) $n(A\cup B)=n(A)+n(B)-n(A\cap B)$

$0.25=0.16+0.14-n(A\cap B)$

$\Rightarrow n(A\cap B)=0.30-0.25=0.05$.

7. (d) $n(M)=55, n(P)=67, n(M\cup P)=100$

Now, $n(M\cup P)=n(M)+n(P)-n(M\cap P)$

$100=55+67-n(M\cap P)$

$\therefore n(M\cap P)=122-100=22$

Now n (P only) $=n(P)-n(M\cap P)=67-22=45$.

8. (a) From De' morgan's law, $A-(B\cap C)=(A-B)\cup(A-C)$.

9. (a) Given $n(N)=12$, $n(P)=16$, $n(H)=18$, $n(N\cup P\cup H)=30$

From, $n(N\cup P\cup H)=n(N)+n(P)+n(H)-n(N\cap P)$

$-n(P\cap H)-n(N\cap H)+n(N\cap P\cap H)$

$\therefore$ $n(N\cap P)+n(P\cap H)+n(N\cap H)=16$

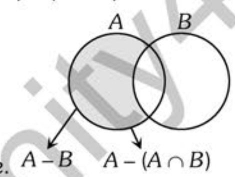
Now, number of pupils taking two subjects

$=n(N\cap P)+n(P\cap H)+n(N\cap H)-3n(N\cap P\cap H)$

$=16-0=16$.

10. (d) $A-B=A-(A\cap B)$ is correct.

$A=(A\cap B)\cup(A-B)$ is correct.



(3) is false.

$\therefore$ (1) and (2) are true.

11. (a) Let B, H, F denote the sets of members who are on the basketball team, hockey team and football team respectively.

Then we are given $n(B)=21, n(H)=26, n(F)=29$

$n(H\cap B)=14$, $n(H\cap F)=15$, $n(F\cap B)=12$

and $n(B\cap H\cap F)=8$.

We have to find $n(B\cup H\cup F)$.

To find this, we use the formula

$n(B\cup H\cup F)=n(B)+n(H)+n(F)$

$-n(B\cap H)-n(H\cap F)-n(F\cap B)+n(B\cap H\cap F)$

Hence, $n(B\cup H\cup F)=(21+26+29)-(14+15+12)+8=43$

12. (b) $S=\{0,1,5,4,7\}$,

then, total number of subsets of S is 2^n.

Hence, $2^5=32$.

13. (b) Given $A\cup\{1,2\}=\{1,2,3,5,9\}$. Hence, $A=\{3,5,9\}$.

14. c) Let $x\in A\Rightarrow x\in A\cup B$, $[\because A\subseteq A\cup B]$

$\Rightarrow x \in A \cap B$, $[\because A \cup B = A \cap B]$

$\Rightarrow x \in A$ and $x \in B \Rightarrow x \in B$, $\therefore A \subseteq B$

Similarly, $x \in B \Rightarrow x \in A$, $\therefore B \subseteq A$

Now $A \subseteq B, B \subseteq A \Rightarrow A = B$.

15. (b) $n(A) = 40\%$ of $10{,}000 = 4{,}000$

$n(B) = 20\%$ of $10{,}000 = 2{,}000$

$n(C) = 10\%$ of $10{,}000 = 1{,}000$

$n(A \cap B) = 5\%$ of $10{,}000 = 500$

$n(B \cap C) = 3\%$ of $10{,}000 = 300$

$n(C \cap A) = 4\%$ of $10{,}000 = 400$

$n(A \cap B \cap C) = 2\%$ of $10{,}000 = 200$

We want to find $n(A \cap B^c \cap C^c) = n[A \cap (B \cup C)^c]$

$= n(A) - n[A \cap (B \cup C)] = n(A) - n[(A \cap B) \cup (A \cap C)]$

$= n(A) - [n(A \cap B) + n(A \cap C) - n(A \cap B \cap C)]$

$= 4000 - [500 + 400 - 200] = 4000 - 700 = 3300.$