Discrete Structures Practice Question

1. Prove that $2n<n!$ for $n\geq 4$
2. Define Pigeon Hole Principle.
3. Prove that $n<2n$, for $n\geq 1$.
4. Find the value of n if $nP13 : (n+1)P12=3:4$.
5. If $nC5=20nC4$, find 'n'.
6. Find the recurrence relation for the sequence $an=2n+9$, $n\geq 1$.
7. Find the recurrence relation which satisfies $y(n)=A\ 3n+B\ (-4)n$.
8. How many positive integers not exceeding 1000 are divisible by 7 or 11?
9. A survey of 500 from a school produced the following information. 200 play volleyball, 120 play hockey. 60 play both volleyball and hockey. How many are not playing either volleyball or hockey?

10. Define complete bipartite graph with example.
11. State the Handshaking Theorem.
12. For the following degree sequences, 4, 4,4,3,2 find if there exists a graph or not.
13. Define mixed graph with example.
14. Write the Definition of Adjacency Matrix of a simple graph.
15. Define Incidence Matrix of a simple graph.
16. Write the Definition of Path Matrix.
17. Define Graph Isomorphism.
18. Write the Definition of Euler Graph.
19. Describe the Hamiltonian Graph.
20. Solve the recurrence relation $D(k)-7D(k-2)+6\ D(k-3)=0$ with $D(0)=8$, $D(1)=6$ and $D(2)=22$.
21. Solve the recurrence relation $S(n)-4\ S(n-1)-11\ S(n-2)+30\ S(n-3)=0$ with $S(0)=0$, $S(1)=-$
22. 35and $S(2)=-85$.
23. Find all the solution of the recurrence relation $an+1-an=3n2-n$, $n\geq 0$ and $a0=3$.
24. Solve the recurrence relation $S(n)-3\ S(n-1)-4\ S(n-2)=4n$.
25. Find all the solution of the recurrence relation $an=5an-1-6an-2+7n$.
26. Solve the recurrence relation $an-7an-1+10an-2=0$ for $n\geq 2$ given that $a0=10$, $a1=41$ using generating functions.
27. Solve the recurrence relation $S(n+1)-2\ S(n)=4n$ with $S(0)=1$ for $n\geq 0$
28. Identify the sequence having the expression $(5+2x/1-4x2)$ as a generating function.
29. Identify the sequence having the expression $(6-29x/30x2-11x+1)$ as a generating function.
30. Prove that in an undirected graph, the number of odd degree vertices is even.