§9.2 Homework Solutions

2) 

0,0,0   1,1,0   1,1,0   1,1,0   2,1,1   2,1,1   2,1,1   2,2,2

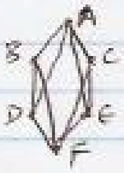
Not sensible for pseudographs, which may have arbitrarily many edges.

3) [BB]   6) a) $n-1$ b) $\binom{n}{2} = \frac{n(n-1)}{2}$ c) Yes K_n

14) ii), iv), v) are all bipartite and are subgraphs. i) and iii) are not bipartite ~~and~~ so cannot be subgraphs.

15) a) [BB]   b) No, left graph has 2 vertices of degree ≥ 3, right graph has only 1.

c) Yes, for example 

& 

d) No, all triangles on RHS have a common vertex.

21) a) c) [BB]   b) Yes 

d) No, there exists an odd cycle (length 5)

e) Yes   f) No, there exists a 3-cycle.

23) a) Yes   b) Yes it would change

25) They are $K_{0,n}$, $K_{1,n-1}$, $K_{2,n-2}$ ... $K_{\frac{n}{2},\frac{n}{2}}$ if n even, so answer is $\frac{n}{2}+1$ if n even
$K_{0,n}$, $K_{1,n-1}$ ..., $K_{\frac{n-1}{2},\frac{n+1}{2}}$ if n odd, so answer is $\frac{n+1}{2}$ if n odd

26) a) $2^{\binom{n}{2}}$ b) $2^{\binom{n}{2}-3}$ c) $\binom{n}{3} 2^{\binom{n}{2}-3}$ d) $\dfrac{\binom{n}{3} 2^{\binom{n}{2}-3}}{2^{\binom{n}{2}}} = \underline{\binom{n}{3}/8}$

28) Let n = # vertices. Then sum of degrees $\geq 3n$. But sum of degrees $= 70$
So $70 \geq 3n \Rightarrow n \leq \underline{23}$.

35) The 10 vertices we know about have degree sum $3+28=31$ so the remaining 3 vertices with unknown degree must also sum to 31 (since total degree sum $= 2 \times 31 = 62$).
The highest possible degree of each of these ~~3~~ three is $12 \times 3 = 36$ but each of the degree 1 vertices can only be connected to at most one of them.
So highest possible total of unknown vertices is $36 - 3 \times 2 = 30$.
So it is <u>not</u> possible to find such a graph