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MATH 221 (Homework-3)

* 6.1

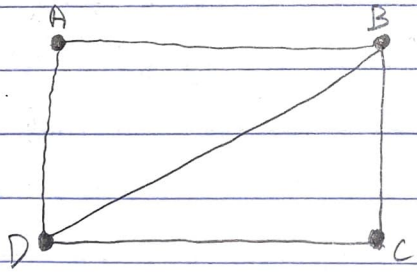
8.

(a) If the graph exists, the sum of degree of vertices is $7 \times 3 = 21$

For any graph to exist; the sum of degrees of each vertex should be even. And in this case, it is odd. ∴ The graph cannot exist.

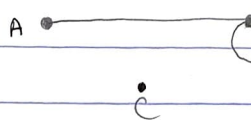
(b) The sum of these nodes = $2 \times 2 + 3 \times 3 = 10$

As the sum of degrees of each vertex is even, the graph is posible.



deg (A) = deg (C) = 2
deg (B) = deg (D) = 3

(C) The sum of these nodes = 0 + 1 + 3 = 4. As the sum of degrees of each vertex is even, The graph is posible.



$[\deg(A) = 1, \deg(B) = 3, \deg(C) = 0]$

(d) For a complete graph of 4 nodes, it should have a degree of 3 at each vertex, so that the other vertices are connected. ∴ The graph is not possible.

16. A, no. of edges = 9
B, no of edges = 9

Number of nodes in A = 5
Number of nodes in B = 5

Degree of node 1 = 3	Degree of node a = 3
Degree of node 2 = 5	Degree of node b = 3
Degree of node 3 = 4	Degree of node c = 3
Degree of node 4 = 3	Degree of node d = 5
Degree of node 5 = 3	Degree of node e = 3

∴ The two are not isomorphic since the degree of nodes are not exactly the same

18. Number of edges in A = 12
Number of edges in B = 12

Number of nodes in A = 6
Number of nodes in B = 6

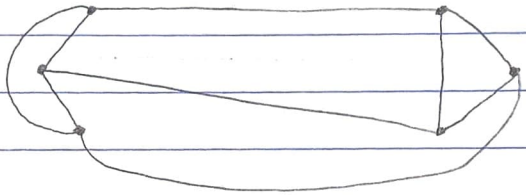
Degree of node 1 = 4	Degree of node a = 4
Degree of node 2 = 4	Degree of node b = 4
Degree of node 3 = 4	Degree of node c = 4
Degree of node 4 = 4	Degree of node d = 4
Degree of node 5 = 4	Degree of node e = 4
Degree of node 6 = 4	Degree of node f = 4

$G_1(1) = a$
$G_1(2) = b$
$G_1(3) = c$
$G_1(4) = d$
$G_1(5) = e$
$G_1(6) = f$

∴ These two graphs are isomorphic

28. For a graph to be planar, it should be drawn in a manner that no edges cross.

We can do this by redrawing the original graph.



In the above case, no edges cross. ∴ The graph is planar.

38.

	1	2	3	4	5
1	1	0	1	0	0
2	0	0	1	1	1
3	1	1	0	1	0
4	0	1	1	0	1
5	0	1	0	1	0

44.