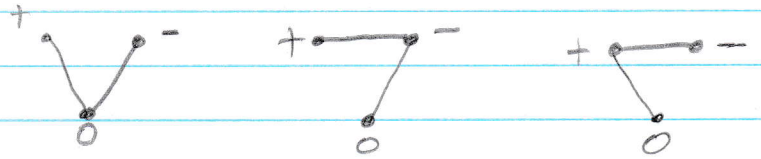
16.1

1) a) $V_a = \{right, left\}$

b) $V_b = \{+, -, 0\}$



c) $V_c = \{north, south, east, west\}$

undirected graph is a tree that is connected and contains no self-loops or cycles.

2) All trees are planar because by euler's formula a trees vertices, edges, and faces is equal to 2.

3) G has n-1 edges

if G has d vertex then G has zero edges

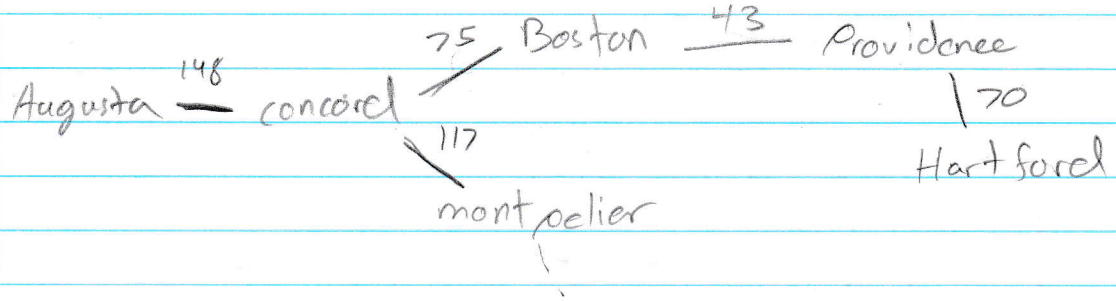
→ $|V| = 1$ $|V| = K$

→ $|V| = K - 1$

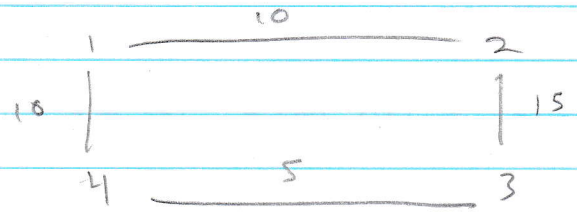
∴ $E = |V| - 1$

10.2

2)

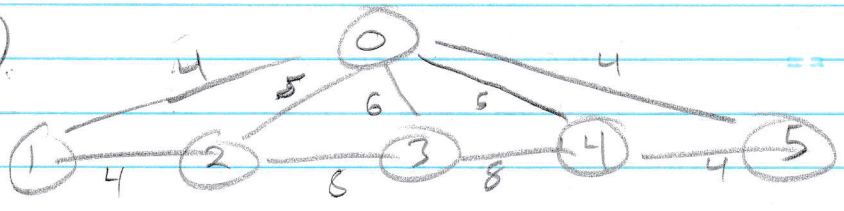


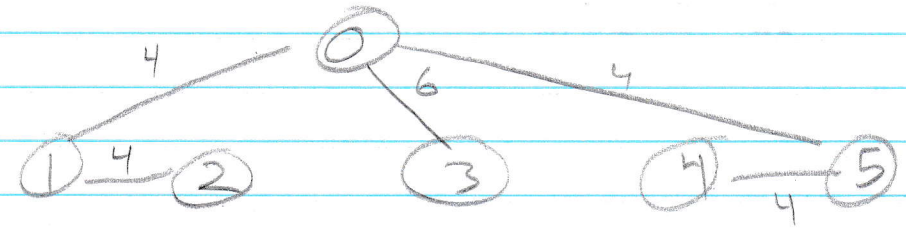
3)



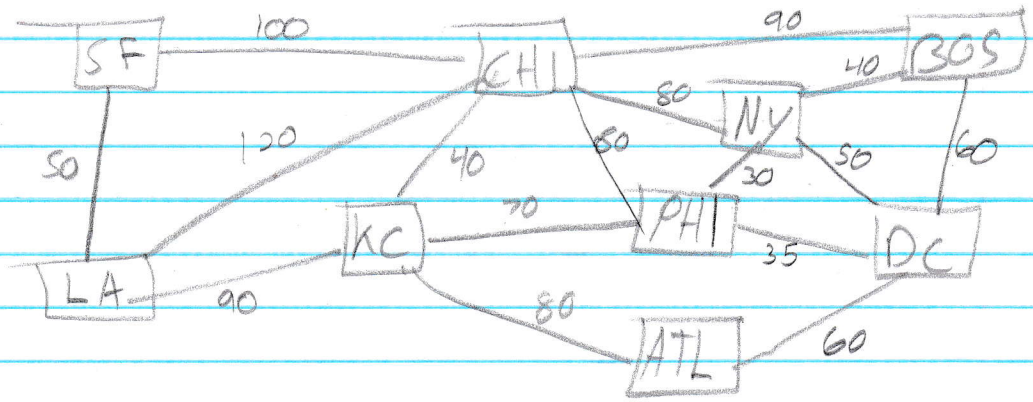
{1, 2} is not a minimum bridge between {1, 4} and {2, 3} but is a minimal spanning tree
∴ no it is not true that only bridge of minimal weight can be minimum spanning tree.

4) a)





b)


SF
CHI
BOS
NY
PHI
DC
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ATL
100
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50
120
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60
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35
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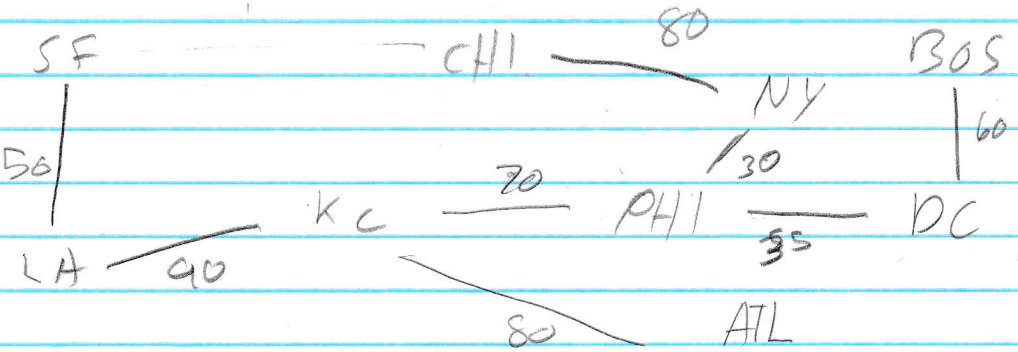
SF
CHI
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BOS
NY
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70
KC
PHI
DC
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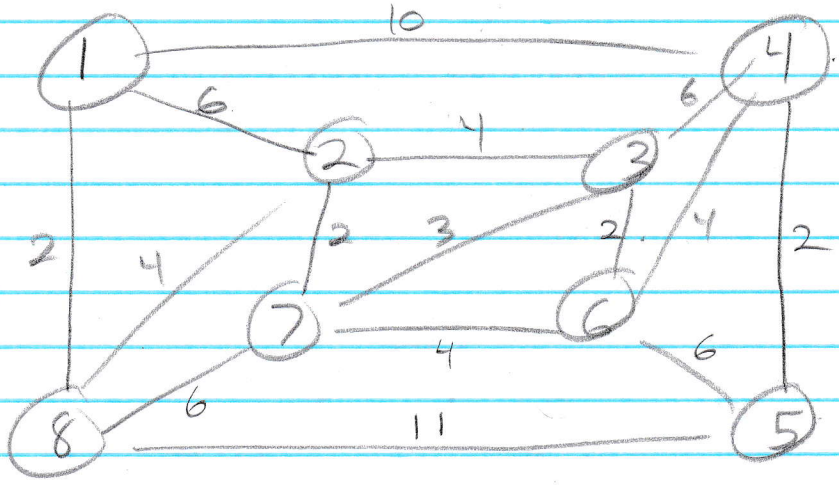
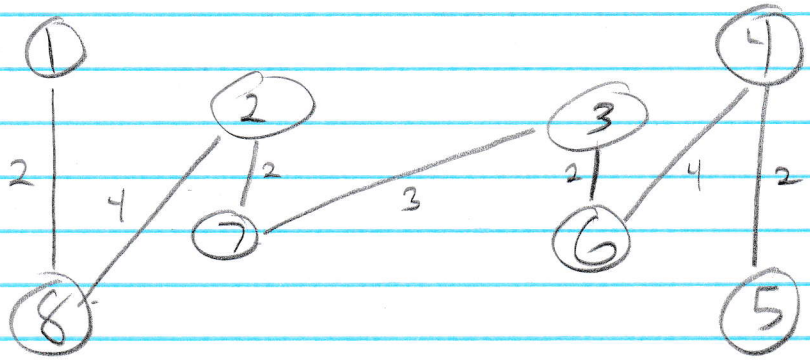
LA
90
80
ATL

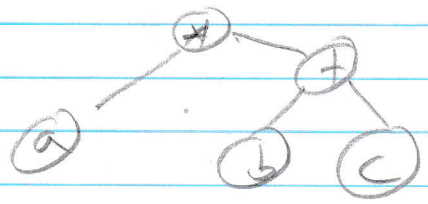
c)


1
10
4
6
6
2
4
3
2
2
3
2
4
2
4
7
6
4
6
6
8
11
5

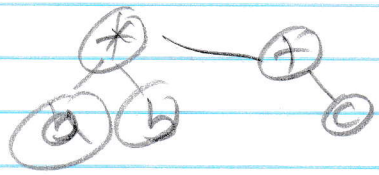

1
4
2
3
2
2
4
2
3
2
4
7
6
8
5

10.4

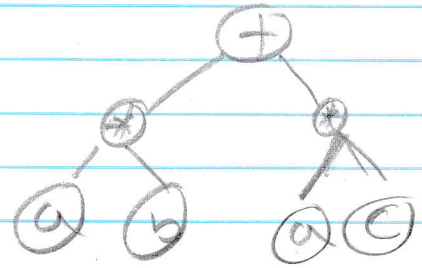
1) a) a(b+c)



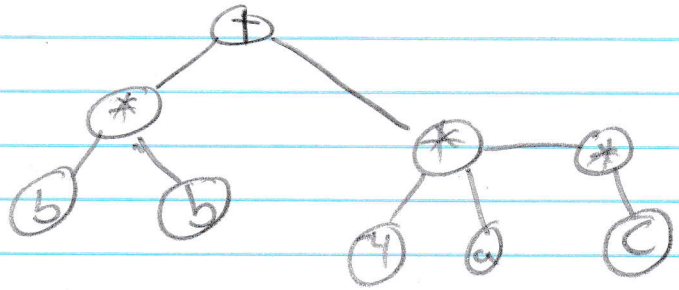
b) ab +c



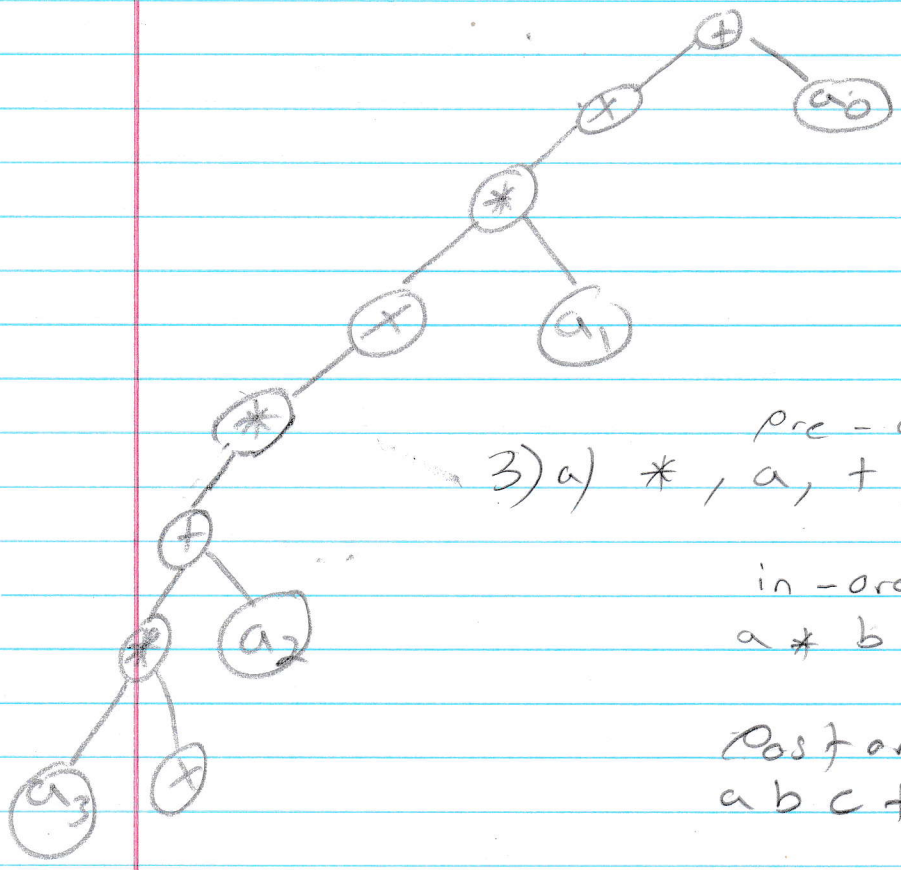
c) ab + ac



d) bb - 4ac



e) $((a_3x + a_2)x + a_1)x + a_0$



3) a) * , a , + , b , c

pre-order

in-order
a * b + c

post order
a b c + *