1)

a)

Answer per student can be different. This is just one example:

243.152.116.0/14

243.100110 00. 116.0.14 → Net Id: 243.152.0.0 and mask /14

Group1:

Each customer neesd 70 → 7 bits are required for implemetation.

1st customer : 243.152.0.0/25 to 243.152.0.127/25

2nd customer: 243.152.0.128/25 to 243.152.0.255/25

...

50th customer: 243.152.24.128/25 to 243.152.24.255/25

Total: 50*128 = 6800

Group2:

Each customer neesd 20 → 5 bits are required for implemetation.

1st customer : 243.152.25.0/27 to 243.152.25.31/27

2nd customer: 243.152.25.32/27 to 243.152.25.63/27

...

125th customer: 243.152.40.128/27 to 243.152.40.159/27

Total: 125*32 = 4000

Group3:

Each customer neesd 5 → 3 bits are required for implemetation.

1st customer : 243.152.41.0/29 to 243.152.41.7/29

2nd customer: 243.152.41.8/29 to 243.152.41.15/29

...

2000 customer: 243.152.40.120/29 to 243.152.103.127/29

Total: 2000*8 = 16000

b) 262144-6400-4000-16000 = 235744 adresses are still available. Also note that there are some unused addresses in each of the customers of each group.

2)

Steps	N	D(0)P(0)	D(1)P(1)	D(2)P(2)	D(3)P(3)	D(4)P(4)	D(5)P(5)	D(6)P(6)	D(7)P(7)
0	6			5,6		3,6	2,6		2,6
1	6 5			5,6	5,5	3,6			2,6
2	6 5 7			5,6	5,5	3,6			
3	6 5 7 4		7,4	5,6	5,5				
4	6 5 7 4 2	6,2	7,4		5,5				
5	6 5 7 4 2 3	6,2	7,4						
6	6 5 7 4 2 3 0		7,4						
7	6 5 7 4 2 3 0 1								

In step 1 you can take either 5,7

In step 1 you can take either 2,3

3)

   a) Since
(1+2+4+8+16+32=63)<64< (1+2+4+8+16+32+33=96)
We conclude that the 64th is sent during the 7th transmission round.

   b) The graph is depicted for up to 26, however up to 20th transmission rounds is all you needed to draw.