

UNIT 08: IP and Subnetting Exercises

1. Write the subnet, broadcast address and valid host range for the following:

a. 192.168.100.17, with 4 bits of subnetting

IP	192	168	100	17
Mask	255	255	255	0
Mask Binary	1111 1111	1111 1111	1111 1111	0000 0000
Mask Sub	1111 1111	1111 1111	1111 1111	1111 0000
New Mask	255	255	255	240
IP	192	168	100	0001 0001
For Host all 0 and sum all the indicated numbers			128 64 32 16 8 4 2 1	128 64 32 16 8 4 2 1
				0001 0000
	192	168	100	16
For Broadcast all 1 and sum all the indicated numbers			128 64 32 16 8 4 2 1	128 64 32 16 8 4 2 1
				0001 1111
	192	168	100	31
Valid Range	192	168	100	17
	192	168	100	30
To get the number of hosts just take the number of bits dedicated to host (4) square ² , minus the ones dedicated to broadcast and network > $2^4 = 16 - 2 = 14$ Possible hosts				

b. 192.168.100.66, with 3 bits of subnetting

IP	192	168	100	66
Mask	255	255	255	0
Mask Binary	1111 1111	1111 1111	1111 1111	000 0 0000
Mask Sub	1111 1111	1111 1111	1111 1111	111 1 0000
New Mask	255	255	255	224
IP	192	168	100	010 0 0010
For Host all 0 and sum all the indicated numbers			128 64 32 16 8 4 2 1	128 64 32 16 8 4 2 1
				0100 0 000
	192	168	100	64
For Broadcast all 1 and sum all the indicated numbers			128 64 32 16 8 4 2 1	128 64 32 16 8 4 2 1
				010 1 1111
	192	168	100	95
Valid Range	192	168	100	65
	192	168	100	94
To get the number of hosts just take the number of bits dedicated to host (5) square ² , minus the ones dedicated to broadcast and network > $2^5 = 32 - 2 = 30$ Possible hosts				

c. 172.16.10.5/20

IP	172	16	10	5
Mask Binary	1111 1111	1111 1111	1111 0000	0000 0000
Mask	255	255	240	0
IP	172	16	10	5
IP 20 bits	172	16	0000 1010	0000 0101
For Host all 0 and sum all the indicated numbers			128 64 32 16 8 4 2 1	128 64 32 16 8 4 2 1
	172	16	0000 0000	0000 0000
	172	16	0	0 /20
For Broadcast all 1 and sum all the indicated numbers			128 64 32 16 8 4 2 1	128 64 32 16 8 4 2 1
	172	16	0000 1111	1111 1111
	172	16	15	255
Valid Range	172	16	0	1
	172	16	15	254
To get the number of hosts just take the number of bits dedicated to host (12) square ² , minus the ones dedicated to broadcast and network > $2^{12} = 4096 - 2 = 4094$ Possible hosts				

d. 172.16.10.33/255.255.252.0

IP	172	16	10	33
Mask Binay	1111 1111	1111 1111	1111 1100	0000 0000
Mask	255	255	252	0
IP	172	16	0000 1010	0010 0001
IP 22 bits	172	16	0000 10 10	0010 0001
For Host all 0 and sum all the indicated numbers			128 64 32 16 8 4 2 1	128 64 32 16 8 4 2 1
	172	16	0000 10 00	0000 0000
	172	16	8	0
For Broadcast all 1 and sum all the indicated numbers			128 64 32 16 8 4 2 1	128 64 32 16 8 4 2 1
	172	16	0000 10 11	1111 1111
	172	16	11	255
Valid Range	172	16	8	1
	172	16	11	254
To get the number of hosts just take the number of bits dedicated to host (10) square ² , minus the ones dedicated to broadcast and network > $2^{10} = 1024 - 2 = 1022$ Possible hosts				

2. You have been asked to create a subnet that supports 126 hosts. What subnet mask is the most efficient one?

For 126 host we need 7 bits because $2^7 = 128$ so it's the closet number				
According to that we create the binary sequence and then translate it to decimal				7 bits for host = 0
Binary	1111 1111	1111 1111	1111 1111	1000 0000
Mask	255	255	255	128
				/25 bits network

3. Given the following information.

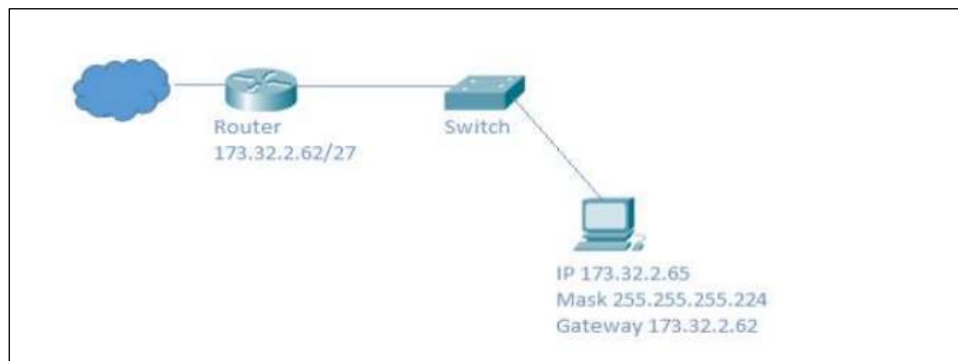
How many subnets are there? How many hosts? What are the valid subnets?

a. Network address: 192.168.10.0

b. Subnet mask: 255.255.255.192

192	168	10	0
255	255	255	192
			128 64 32 16 8 4 2 1
1111 1111	1111 1111	1111 1111	11 00 0000
			/26 bits network
		2 bits for Subnets means 4 subnets (2 ²)	
Magic number is 64 – Network and Broadcast = 62 Possible Host			
Possible Combinations are (Host = 0 Broadcast =1)			
00 000000 ₂ = 0	01 000000 = 64	10 000000 = 128	11 000000 = 192
Network			
192.168.10.0	192.168.10.64	192.168.10.128	192.168.10.192
Broadcast			
192.168.10.63	192.168.10.127	192.168.10.191	192.168.10.255
Valid Range			
192.168.10.1	192.168.10.65	192.168.10.129	192.168.10.193
192.168.10.62	192.168.10.126	192.168.10.190	198.168.10.254

4. What is the problem in this Network?



The router and the host must be in the same network, but Router is in Network 2 and Host in Network 3

Mask			
255	255	255	224
Mask in Binary			
1111 1111	1111 1111	1111 1111	1110 0000
8 + 8 + 8 + 3 = 27 bits network 5 bits Host Magic Number is 32 - 2 = 30			
Network 1	173.32.2.0 (0)	173.32.2.31	
Network 2	173.32.2.32 (+32)	173.32.2.63	Router is 173.32.2.62
Network 3	173.32.2.64 (+32)	173.32.2.95	Computer is 173.32.2.65
Network 4	173.32.2.96 (+32)	173.32.0.127	

5. XYZ Company would like to subnet its network so that there are five separate subnets. They will need 25 computers in each subnet. Complete the following table:

NOTE: If you create more than five subnets, list the extra ones too.

First, we need to get the Mask for Class C				
Mask	255	255	255	224
Mask Binary	1111 1111	1111 1111	1111 1111	111 0 0000
Subnet Mask	255	255	255	224
3 bits for Subnets = $2^3 = 8$				