1. Write the subnet, broadcast address and valid host range for the following:
2. 192.168.100.17, with 4 bits of subnetting

14 host range / 255.255.255.0 / 192.168.100.16

This network is Class C. The general mask for this class is 255.255.255.0(00000000) but 4 bits of subnet means we need to add 4 extra bits to the subnet 11111111.11111111.11111111.**1111**0000 which into decimal we have 255.255.255.240 (underlined 0’s are for the host).

To find broadcast we will only turn last 4 bits for the host into 1’s.

As network is 192.168.100.17(**0001**0001) broadcast will be 192.168.100.31(**0001**1111) and the host range would be 14(31-17)

1. 192.168.100.66, with 3 bits of subnetting

This is a Class C network. The general mask for this class is 255.255.255.0(00000000) but we need to add 3 extra bits of subnet which would be 255.255.255.224(**111**00000) with 5 bits for host.

We know 192.168.100.66(**010**00010)

Now, in order to find broadcast address, we need to turn 5 bits for host into 1’s, and in order to find network address we turn them into 0’s.

* 192.168.100.95(**010**11111)
* 192.168.100.64(**010**00000)

The range of hosts won’t count with broadcast and network address; therefore, we can do: **-2=30 hosts.**

1. 172.16.10.5/20

We have here a Class B network. It says /20 bits for the mask which is:

**11111111.11111111.1111**0000.00000000

We know that the first two numbers remains the same to represent the network. The last two numbers are the ones that change to represent the hosts.

To represent the network: 172.16.0.0(00000000.00000000)

To represent the broadcast: 172.16.15.255(00001111.11111111)

Now, the number of hosts available is **.**

1. 172.16.10.33/255.255.252.0

It is a Class B and we have 255.255.252.0(**111111**00.00000000), which means 22 bits to represent the network and 10 bits to represent the host.

As the last two numbers are the changing ones, we just need them into binary. Remember, we turn the hosts bits into 0’s to find the network address, and into 1’s to find the broadcast address.

* 172.16.8.0(00001000.00000000) network address
* 172.16.11.255(00001011.11111111) broadcast address.

Host range is: As we exclude network and broadcast address.

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

We know that the 0’s at a mask are dedicated to represent hosts.

The most efficient subnet mask would be 255.255.255.128(1**0000000**) or /25

1. Given the following
2. Network address: 192.168.10.0
3. Subnet mask: 255.255.255.192

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

This network is a Class C. Subnet is 11111111.11111111.11111111.11000000, which means we have 6 bits for the host and 26 for the network.

192.168.10.00000000 subnet is 192.168.10.0

2 bits for subnetting – we must make all the possible combinations with these two bits to find the valid subnets.

192.168.10.0(**00**000000)

192.168.10.64(**01**000000)

192.168.10.128(**10**000000)

192.168.10.192(**11**000000)

192.168.10.00111111 broadcast is 192.168.10.63

As **=62 hosts**.

|  |  |  |  |
| --- | --- | --- | --- |
| Subnet | Network address | Host addresses | Broadcast address |
| Subnet mask: 255.255.255.224 | | | |
| First subnet | 192.168.162.0 | 192.168.162.1- 192.168.162.30 | 192.168.162.31 |
| Second subnet | 192.168.162.32 | 192.168.162.33- 192.168.162.62 | 192.168.162.63 |
| Third subnet | 192.168.162.64 | 192.168.162.65- 192.168.162.94 | 192.168.162.95 |
| Fourth subnet | 192.168.162.96 | 192.168.162.97- 192.168.162.126 | 192.168.162.127 |
| Fifth subnet | 192.168.162.128 | 192.168.162.129- 192.168.162.159 | 192.168.162.160 |
| Sixth subnet ? |  |  |  |
| ? |  |  |  |

1. 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.

**Num of 1 we want for the subnet and the num of 0 we want for the hosts at the octal.**

To supply hosts’ requirement, we need to find the minimum power of two than could fit 25 computers. (Magical number)

At this point we know we need to reserve 5 bits for host and 3 for subnetting. Therefore, subnet mask is 255.255.255.224(**111**00000)

Possible subnetworks:

* 192.168.162.0(**000**00000)
  + First address: 192.168.162.1(**000**00001)
  + Last address: 192.168.162.30(**000**11110)
  + Broadcast: 192.168.162.31(**000**11111)
* 192.168.162.32(**001**00000)
  + First address: 192.168.162.33(**001**00001)
  + Last address: 192.168.162.62(**001**11110)
  + Broadcast: 192.168.162.63(**001**11111)
* 192.168.162.64(**010**00000)
  + First address: 192.168.162.65(**010**00001)
  + Last address: 192.168.162.94(**010**11110)
  + Broadcast: 192.168.162.95(**010**11111)
* 192.168.162.96(**011**00000)
  + First address: 192.168.162.97(**011**00001)
  + Last address: 192.168.162.126(**011**11110)
  + Broadcast: 192.168.162.127(**011**11111)
* 192.168.162.128(**100**00000)
  + First address: 192.168.162.129(**100**00001)
  + Last address: 192.168.162.158(**100**11110)
  + Broadcast: 192.168.162.159(**100**11111)