

## Subnetting

1. Given a class A network address with of 10.0.0.0 /24 answer the following questions:

How many bits were borrowed from the host portion of this address? 16

What is the subnet mask for this network? 255.255.255.0

How many usable subnetworks are there?  $2^{16} - 2$

How many usable hosts are there per subnet?  $254 (2^8 - 2)$

What is the host range for usable subnet sixteen? 10.0.16.1-10.0.16.254

What is the network address for usable subnet sixteen? 10.0.16.0

What is the broadcast address for usable subnet sixteen? 10.0.16.255

What is the broadcast address for the last usable subnet? 10.254.255.255

What is the broadcast address for the major network? 10.255.255.255

2. Develop an IP addressing scheme for the 192.168.2.0 class C address. You must use the appropriate subnet mask to create at least ten subnets, with at least ten hosts on each subnet.

Which subnet mask did you choose? 255.255.255.240

How many subnets will be created using this mask?  $14 (2^4 - 2)$

How many hosts can be addressed on each subnet?  $14 (2^4 - 2)$

Since you know how many hosts (16) each subnet contains, it is easy to determine the subnet numbers for all of the subnets (start at 0 and add 16).

Complete the table below:

Subnet number	Subnetwork address
0	192.168.2.0 /28
1	192.168.2.16 /28
2	192.168.2.32 /28
3	192.168.2.48 /28
4	192.168.2.64 /28
5	192.168.2.80 /28

6	192.168.2.96 /28
7	192.168.2.112 /28
8	192.168.2.128 /28
9	192.168.2.144 /28
10	192.168.2.160 /28
11	192.168.2.176 /28
12	192.168.2.192 /28
13	192.168.2.208 /28
14	192.168.2.224 /28
15	192.168.2.240 /28

What is the subnetwork number for the fourth subnet? 192.168.2.48

Remember the fourth subnet created here is labeled subnet 3. Since this scenario considers subnet 0 to be “unusable”, the third usable subnet is subnet 3.

3. A company has the class B address 172.16.0.0. The company needs to create a subnetting scheme to provide the following:
- 36 subnets with at least 100 hosts
  - 24 subnets with at least 255 hosts
  - 10 subnets with at least 50 hosts

It is not necessary to supply an address for the WAN connection, since it is supplied by the Internet service provider.

Answer the following questions:

How many subnets are needed for this network? 70

What is the minimum number of bits that can be borrowed? 7

What is the subnet mask for this network? 255.255.254.0

How many usable subnetworks are there? 126 (2^7 - 2)

How many usable hosts are there per subnet? 510 (2^9 - 2)

Complete the following chart listing the first three subnets and the last four subnets:

Subnetwork #	Subnetwork ID	Host Range	Broadcast ID
0	172.16.0.0	172.16.0.1 - 172.16.1.254	172.16.1.255
1	172.16.2.0	172.16.2.1 - 172.16.3.254	172.16.3.255

2	172.16.4.0	172.16.4.1 – 172.16.5.254	172.16.5.255
3	172.16.6.0	172.16.6.1 – 172.16.7.254	172.16.7.255
124	172.16.248.0	172.16.248.1 – 172.16.249.254	172.16.249.255
125	172.16.250.0	172.16.250.1 – 172.16.251.254	172.16.251.255
126	172.16.252.0	172.16.252.1 – 172.16.253.254	172.16.253.255
127	172.16.254.0	172.16.254.1 – 172.16.255.254	172.16.255.255

What is the host range for subnet two? \_\_\_ 172.16.2.1 – 172.16.3.254 \_\_\_\_\_

What is the broadcast address for the 126<sup>th</sup> subnet? \_\_\_ 172.16.251.255 \_\_\_\_\_

What is the broadcast address for the major network? \_\_\_ 172.16.255.255 \_\_\_\_\_