LAB 6
Subnetting

Objective
The objective of this lab is to provide a subnetting scheme using a Class B network

1.

Background / Preparation
This is a written lab and is to be performed without the aid of an electronic calculator. ABC Manufacturing has acquired a 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.

Step 1 Given this Class B network address and these requirements 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?

Dotted decimal **255.255.254.0**
Binary **11111111 11111111 11111110 00000000**
CIDR **/23**

How many usable subnetworks are there? **128**

How many usable hosts are there per subnet? **510**

Step 2 Complete the following chart listing the first three subnets

Subnetwork #	Host Range	Broadcast ID
172.16.0.0	**172.16.0.1 - 172.16.1.254**	**172.16.1.255**
172.16.2.0	**172.16.2.1 - 172.16.3.254**	**172.16.3.255**
172.16.4.0	**172.16.4.1 - 172.16.5.254**	**172.16.5.255**
172.16.6.0	**172.16.6.1 - 172.16.7.254**	**172.16.7.255**

2.

Background / Preparation
XYZ Industrials has acquired a Class B address, 184.113.0.0. The company needs to create a subnet mask that will divide the network into 1,000 subnetworks with at least 50 hosts each.

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

What is the minimum number of bits that can be borrowed? **10**

What is the subnet mask for this network?

Dotted decimal **255.255.255.192**
Binary **11111111 11111111 11111111 11000000**
CIDR **/26**

How many usable subnetworks are there? **1024**

How many usable hosts are there per subnet? **62**

Step 2 Complete the following chart listing the first three subnets

Subnetwork #	Host Range	Broadcast ID
184.113.0.0	**184.113.0.1 - 184.113.0.62**	**184.113.0.63**
184.113.0.64	**184.113.0.65 - 184.113.0.126**	**184.113.0.127**
184.113.0.128	**184.113.0.129 - 184.113.0.190**	**184.113.0.191**
184.113.0.192	**184.113.0.193 - 184.113.0. 254**	**184.113.0.255**

3.

Background / Preparation
The Black Mesa Research Facility has a Class C address, 192.168.0.0. The company needs to create a subnet mask that will provide 5 subnetworks with at least 25 hosts each.

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

What is the minimum number of bits that can be borrowed? **3**

What is the subnet mask for this network?

Dotted decimal **255.255.255.224**
Binary **11111111.11111111.11111111.11100000**
CIDR **192.168.0.0/27**

How many usable subnetworks are there? **8**

How many usable hosts are there per subnet? **30**

Step 2 Complete the following chart listing the first three subnets

Subnetwork #	Host Range	Broadcast ID
192.168.0.0	**192.168.0.1 - 192.168.0.30**	**192.168.0.31**
192.168.0.32	**192.168.0.33 - 192.168.0.62**	**192.168.0.63**
192.168.0.64	**192.168.0.65 - 192.168.0.94**	**192.168.0.95**
192.168.0.96	**192.168.0.97 - 192.168.0.126**	**192.168.0.127**

4.

Background / Preparation
Aperture Science has a Class A address, 10.0.0.0. The company needs to create a subnet mask that will provide 500 subnetworks with at least 30,000 hosts each.

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

What is the minimum number of bits that can be borrowed? **9**

What is the subnet mask for this network?

Dotted decimal **255.255.128.0**
Binary **11111111.11111111.10000000.00000000**
CIDR **10.0.0.0 / 17**

How many usable subnetworks are there? **512**

How many usable hosts are there per subnet? **32,766**

Step 2 Complete the following chart listing the first three subnets

Subnetwork #	Host Range	Broadcast ID
10.0.0.0	**10.0.0.1 - 10.0.127.254**	**10.0.127.255**
10.0.128.0	**10.0.128.1 - 10.0.255.254**	**10.0.255.255**
10.1.0.0	**10.1.0.1 - 10.1.127.254**	**10.1.127.255**
10.1.128.0	**10.1.128.1 - 10.1.255.254**	**10.1.255.255**
