

Lab - Calculate IPv4 Subnets

# Objectives

**Part 1: Determine IPv4 Address Subnetting Part 2: Calculate IPv4 Address Subnetting**

# Background / Scenario

The ability to work with IPv4 subnets and determine network and host information based on a given IP address and subnet mask is critical to understanding how IPv4 networks operate. The first part is designed to reinforce how to compute network IP address information from a given IP address and subnet mask. When given an IP address and subnet mask, you will be able to determine other information about the subnet.

* 1 PC (Windows with Internet access)
* Optional: IPv4 address calculator

# Instructions

Fill out the tables below with appropriate answers given the IPv4 address, original subnet mask, and new subnet mask.

**Problem 1:**

|  |  |
| --- | --- |
| **Given:** | |
| **Host IP Address:** | 192.168.200.139 |
| **Original Subnet Mask** | 255.255.255.0 |
| **New Subnet Mask:** | 255.255.255.224 |

|  |  |
| --- | --- |
| **Find:** | |
| **Number of Subnet Bits** | **3** |
| **Number of Subnets Created** | **8** |
| **Number of Host Bits per Subnet** | **5** |
| **Number of Hosts per Subnet** | **30** |
| **Network Address of this Subnet** | **192.168.200.128** |
| **IPv4 Address of First Host on this Subnet** | **192.168.200.129** |
| **IPv4 Address of Last Host on this Subnet** | **192.168.200.158** |
| **IPv4 Broadcast Address on this Subnet** | **192.168.200.159** |

**Problem 2:**

|  |  |
| --- | --- |
| **Given:** | |
| **Host IP Address:** | 10.101.99.228 |
| **Original Subnet Mask** | 255.0.0.0 |
| **New Subnet Mask:** | 255.255.128.0 |

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| --- | --- |
| **Find:** | |
| **Number of Subnet Bits** | **9** |
| **Number of Subnets Created** | **512** |
| **Number of Host Bits per Subnet** | **15** |
| **Number of Hosts per Subnet** | **32766** |
| **Network Address of this Subnet** | **10.101.0.0** |
| **IPv4 Address of First Host on this Subnet** | **10.101.0.1** |
| **IPv4 Address of Last Host on this Subnet** | **10.101.127.254** |
| **IPv4 Broadcast Address on this Subnet** | **10.101.127.255** |

**Problem 3:**

|  |  |
| --- | --- |
| **Given:** | |
| **Host IP Address:** | 172.22.32.12 |
| **Original Subnet Mask** | 255.255.0.0 |
| **New Subnet Mask:** | 255.255.224.0 |

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| --- | --- |
| **Find:** | |
| **Number of Subnet Bits** | **3** |
| **Number of Subnets Created** | **8** |
| **Number of Host Bits per Subnet** | **13** |
| **Number of Hosts per Subnet** | **8190** |
| **Network Address of this Subnet** | **172.22.32.0** |
| **IPv4 Address of First Host on this Subnet** | **172.22.32.1** |
| **IPv4 Address of Last Host on this Subnet** | **172.22.63.254** |
| **IPv4 Broadcast Address on this Subnet** | **172.22.63.255** |

**Problem 4:**

|  |  |
| --- | --- |
| **Given:** | |
| **Host IP Address:** | 192.168.1.245 |
| **Original Subnet Mask** | 255.255.255.0 |
| **New Subnet Mask:** | 255.255.255.252 |

|  |  |
| --- | --- |
| **Find:** | |
| **Number of Subnet Bits** | **6** |
| **Number of Subnets Created** | **64** |
| **Number of Host Bits per Subnet** | **2** |
| **Number of Hosts per Subnet** | **2** |
| **Network Address of this Subnet** | **192.168.1.244** |
| **IPv4 Address of First Host on this Subnet** | **192.168.1.245** |
| **IPv4 Address of Last Host on this Subnet** | **192.168.1.246** |
| **IPv4 Broadcast Address on this Subnet** | **192.168.1.247** |

**Problem 5:**

|  |  |
| --- | --- |
| **Given:** | |
| **Host IP Address:** | 128.107.0.55 |
| **Original Subnet Mask** | 255.255.0.0 |
| **New Subnet Mask:** | 255.255.255.0 |

|  |  |
| --- | --- |
| **Find:** | |
| **Number of Subnet Bits** | **8** |
| **Number of Subnets Created** | **256** |
| **Number of Host Bits per Subnet** | **8** |
| **Number of Hosts per Subnet** | **254** |
| **Network Address of this Subnet** | **128.107.0.0** |
| **IPv4 Address of First Host on this Subnet** | **128.107.0.1** |
| **IPv4 Address of Last Host on this Subnet** | **128.107.0.254** |
| **IPv4 Broadcast Address on this Subnet** | **128.107.0.255** |

**Problem 6:**

|  |  |
| --- | --- |
| **Given:** | |
| **Host IP Address:** | 192.135.250.180 |
| **Original Subnet Mask** | 255.255.255.0 |
| **New Subnet Mask:** | 255.255.255.248 |

|  |  |
| --- | --- |
| **Find:** | |
| **Number of Subnet Bits** | **5** |
| **Number of Subnets Created** | **32** |
| **Number of Host Bits per Subnet** | **3** |
| **Number of Hosts per Subnet** | **6** |
| **Network Address of this Subnet** | **192.135.250.176** |
| **IPv4 Address of First Host on this Subnet** | **192.135.250.177** |
| **IPv4 Address of Last Host on this Subnet** | **192.135.250.182** |
| **IPv4 Broadcast Address on this Subnet** | **192.135.250.183** |

# Reflection Question

Why is the subnet mask so important when analyzing an IPv4 address? **Subnet mask defines network and host portion of the IPv4 address. You can’t** **get such information without it**