Subnetting Practice Questions with Solutions

Question 1

Given IP: 192.168.50.75/27 Find:

- Network Address
- Subnet Mask
- Number of Host Bits
- Number of Hosts per Subnet
- Broadcast Address
- First Usable Host
- Last Usable Host
- Wildcard Mask

Solution 1:

Given: 192.168.50.75/27

Step 1: Identify subnet information

- /27 = 27 network bits, 5 host bits
- Subnet Mask: 255.255.255.224

Step 2: Calculate subnet increment

- Increment = 256 - 224 = 32
- Subnets: 0, 32, 64, 96, 128, 160, 192, 224

Step 3: Find which subnet contains 75

- 75 falls between 64 and 96
- Network Address: **192.168.50.64**

Step 4: Calculate all addresses

- **Network Address:** 192.168.50.64
- **Subnet Mask:** 255.255.255.224
- **Number of Host Bits:** 5
- **Number of Hosts per Subnet:** 2^5 - 2 = 30
- **Broadcast Address:** 192.168.50.95
- **First Usable Host:** 192.168.50.65

- **Last Usable Host:** 192.168.50.94
- **Wildcard Mask:** 0.0.0.31

Question 2

Given IP: 10.25.130.200/25 Find:

- Network Address
- Subnet Mask
- Number of Subnets (from /24)
- Broadcast Address
- Host Range
- Wildcard Mask

Solution 2:

Given: 10.25.130.200/25

Step 1: Identify subnet information

- /25 = 25 network bits, 7 host bits
- Subnet Mask: 255.255.255.128

Step 2: Calculate subnet increment

- Increment = 256 - 128 = 128
- Subnets: 0, 128

Step 3: Find which subnet contains 200

- 200 falls between 128 and 255
- Network Address: **10.25.130.128**

Step 4: Calculate all addresses

- **Network Address:** 10.25.130.128
- **Subnet Mask:** 255.255.255.128
- **Number of Subnets (from /24):** 2^1 = 2
- **Broadcast Address:** 10.25.130.255
- **Host Range:** 10.25.130.129 - 10.25.130.254
- **Wildcard Mask:** 0.0.0.127

Question 3

Given IP: 172.16.45.89/26 Find:

- Network Address
- Subnet Mask
- Total Addresses in Subnet
- Usable Hosts
- Next Subnet Address
- Wildcard Mask
- ACL Statement to permit this subnet

Solution 3:

Given: 172.16.45.89/26

Step 1: Identify subnet information

- /26 = 26 network bits, 6 host bits
- Subnet Mask: 255.255.255.192

Step 2: Calculate subnet increment

- Increment = 256 - 192 = 64
- Subnets: 0, 64, 128, 192

Step 3: Find which subnet contains 89

- 89 falls between 64 and 127
- Network Address: **172.16.45.64**

Step 4: Calculate all addresses

- **Network Address:** 172.16.45.64
- **Subnet Mask:** 255.255.255.192
- **Total Addresses in Subnet:** 64
- **Usable Hosts:** 62
- **Next Subnet Address:** 172.16.45.128
- **Wildcard Mask:** 0.0.0.63
- **ACL Statement:** access-list 10 permit 172.16.45.64 0.0.0.63

Question 4

Given IP: 203.45.67.156/28 Find:

- Network Address
- Subnet Mask
- Broadcast Address
- Host Range
- Number of Host Bits
- Wildcard Mask
- All possible /28 subnets in this /24 network

Solution 4:

Given: 203.45.67.156/28

Step 1: Identify subnet information

- /28 = 28 network bits, 4 host bits
- Subnet Mask: 255.255.255.240

Step 2: Calculate subnet increment

- Increment = 256 - 240 = 16
- Subnets: 0, 16, 32, 48, 64, 80, 96, 112, 128, 144, 160, 176, 192, 208, 224, 240

Step 3: Find which subnet contains 156

- 156 falls between 144 and 159
- Network Address: **203.45.67.144**

Step 4: Calculate all addresses

- **Network Address:** 203.45.67.144
- **Subnet Mask:** 255.255.255.240
- **Broadcast Address:** 203.45.67.159
- **Host Range:** 203.45.67.145 - 203.45.67.158
- **Number of Host Bits:** 4
- **Wildcard Mask:** 0.0.0.15

All /28 subnets in 203.45.67.0/24:

- 203.45.67.0/28, 203.45.67.16/28, 203.45.67.32/28, 203.45.67.48/28
- 203.45.67.64/28, 203.45.67.80/28, 203.45.67.96/28, 203.45.67.112/28
- 203.45.67.128/28, 203.45.67.144/28, 203.45.67.160/28, 203.45.67.176/28

- 203.45.67.192/28, 203.45.67.208/28, 203.45.67.224/28, 203.45.67.240/28

Question 5

Given IP: 192.168.100.37/29 Find:

- Network Address
- Subnet Mask
- Number of Subnets created from /24
- Hosts per Subnet
- Broadcast Address
- Wildcard Mask
- Previous and Next Subnet

Solution 5:

Given: 192.168.100.37/29

Step 1: Identify subnet information

- /29 = 29 network bits, 3 host bits
- Subnet Mask: 255.255.255.248

Step 2: Calculate subnet increment

- Increment = 256 - 248 = 8
- Subnets: 0, 8, 16, 24, 32, 40, 48, 56... (every 8)

Step 3: Find which subnet contains 37

- 37 falls between 32 and 39
- Network Address: **192.168.100.32**

Step 4: Calculate all addresses

- **Network Address:** 192.168.100.32
- **Subnet Mask:** 255.255.255.248
- **Number of Subnets (from /24):** 2^5 = 32 subnets
- **Hosts per Subnet:** 2^3 - 2 = 6
- **Broadcast Address:** 192.168.100.39
- **Wildcard Mask:** 0.0.0.7
- **Previous Subnet:** 192.168.100.24/29

- **Next Subnet:** 192.168.100.40/29

Question 6

Given IP: 10.50.75.200/30 Find:

- Network Address
- Subnet Mask
- Total Host Addresses
- Usable Host Addresses
- Broadcast Address
- Host Range
- Wildcard Mask
- What type of connection is this subnet typically used for?

Solution 6:

Given: 10.50.75.200/30

Step 1: Identify subnet information

- /30 = 30 network bits, 2 host bits
- Subnet Mask: 255.255.255.252

Step 2: Calculate subnet increment

- Increment = 256 - 252 = 4
- Subnets: 0, 4, 8, 12, 16... 196, 200, 204, 208

Step 3: Find which subnet contains 200

- 200 is exactly on the subnet boundary
- Network Address: **10.50.75.200**

Step 4: Calculate all addresses

- **Network Address:** 10.50.75.200
- **Subnet Mask:** 255.255.255.252
- **Total Host Addresses:** 4
- **Usable Host Addresses:** 2
- **Broadcast Address:** 10.50.75.203
- **Host Range:** 10.50.75.201 - 10.50.75.202

- **Wildcard Mask:** 0.0.0.3
- **Typical Use:** Point-to-point links between routers (WAN connections)

Quick Reference Formulas Used:

1. **Subnet Increment = 256 - Subnet Mask Value (in interesting octet)**
2. **Hosts per Subnet = 2^(host bits) - 2**
3. **Number of Subnets = 2^(borrowed bits)**
4. **Wildcard Mask = 255.255.255.255 - Subnet Mask**
5. **Broadcast Address = Next Network Address - 1**
6. **First Host = Network Address + 1**
7. **Last Host = Broadcast Address - 1**