

**Question1:Your task is to determine if these devices are on the same subnet or different subnets. You can do this by using the address and mask of each device to determine to which subnet each address belongs or use other method.**

**DeviceA: 172.16.17.30/20**

**DeviceB: 172.16.28.15/20**

**Answer**

**Determining the Subnet for DeviceA:**

172.16.17.30 - 10101100.00010000.00010001.00011110

255.255.240.0 - 11111111.11111111.11110000.00000000

-----| sub|-----

subnet = 10101100.00010000.00010000.00000000 = 172.16.16.0

Looking at the address bits that have a corresponding mask bit set to one, and setting all the other address bits to zero (this is equivalent to performing a logical "AND" between the mask and address), shows that DeviceA belongs to subnet 172.16.16.0.

**Other method:**

To determine to which subnet each address belongs, we need to determine which octet we are subnetting in. Since this address is a /20, we are subnetting in the 3rd octet. Now we need to convert the IP address to binary.

10101100.00010000.00010001.00011110

Since the first 20 bits are network bits, we cannot touch them. To find the Network IP, set all the host bits (last 12) to 0

10101100.00010000.00010000.00000000

So the Network IP is 172.16.16.0

**Determining the Subnet for DeviceB:**

172.16.28.15 - 10101100.00010000.00011100.00001111

255.255.240.0 - 11111111.11111111.11110000.00000000

-----| sub|-----

subnet = 10101100.00010000.00010000.00000000 = 172.16.16.0

From these determinations, DeviceA and DeviceB have addresses that are part of the same subnet.

**Question 2 Given a Host Address = 172.16.0.0/20 Calculate the broadcast address and the host range.**

**Answer**

Subnet Mask in Binary            11111111.11111111.11110000.00000000

Network in Binary                10101100.00010000.00000000.00000000

Network in Decimal                172            16            0            0

To find the Broadcast IP, set all the host bits to 1

Broadcast addr. Bin                10101100.00010000.00001111.11111111

Broadcast addr. Dec                172            16            15            255

Subnet Mask in Decimal = 255.255.240.0

How many host ? 12 So  $2^{12}-2=4096-2=4094$  Hosts

Host Address Range = 172.16.0.1 to 172.16.15.254

**Question3: What is the last valid host on the subnetwork 172.17.136.0 255.255.252.0?**

**Answer**

Network in Binary                10101100.00010001.10001000.00000000

Subnet Mask in Binary            11111111.11111111.11111100.00000000

To find the Broadcast IP, set all the host bits to 1

Broadcast addr. Bin                10101100.00010001.10001011.11111111

Answer: 172.17.139.254

**Question4: Which subnet does host 192.168.50.77/26 belong to?**

**Answer:** 192.168.50.64

**Question5: What is the last valid host on the subnetwork 172.26.177.0 255.255.255.128?**

**Answer:** 172.26.177.126

**Question6. How many host addresses may be assigned when using the 128.107.0.0 network address with a subnet mask of 255.255.240.0?**

**Answer 4094**

**Question7. if you wanted to have 12 subnets with a class C network ID, which subnet mask would you use?**

**Answer: 255.255.255.240**

**Question8. what is the broadcast address of the subnet address 172.16.8.159 255.255.255.192?**

**answer: 172.16.8.191**