ExamCompass N10-008 Subnetting KEY

https://www.examcompass.com/comptia-network-plus-n10-008-exam-subnetting-quiz

In order to subnet, the following table* must be memorized or written down for reference

128	64	32	16	8	4	2	1
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Q: What is the last usable host IP address for the 172.45.120.0/23 network?

Soln:

172.X.X.X is a class B network /16; however, this question focuses on hosts, so we will focus on the host ID portion of the IP address.

A /23 network has 32-23 bits available for IP addresses = 2^9 IP addresses = 512 possible IP addresses

Since 512 is > 255, all bits in the last octet and the last bit of the third octet is used for IP addressing

The greatest address, in a given network, is the broadcast address. So, the last usable address is the max address (all 1s) minus 1. Reducing the max address by 1, in this case (9 bits for IP addressing) is represented as: 172.45. XXXXXXX1 11111110 or 172.45.121.254

Q: How many usable IP addresses can be assigned to hosts on a /26 subnet?

Soln: # hosts = $2^{(^n)}-2$ => 32-26 => $2^{(^6)}-2$ = 62

Q: What is the dot-decimal representation of a /13 subnet mask?

Soln:

11111111	11111000	00000000	00000000
255	*128+64+32+16+8		
	248	0	0

255.248.0.0

Q: What is the maximum number of subnets and hosts per subnet for the 192.168.50.247 255.255.255.224 network?

Soln:

192.X.X.X is a class C network /24

The subnet mask is /27

#subnet bits = 3; #host bits = 5

Max Subnets = 2(^n), where n is the #subnetting bits => 2^3 = 8 subnets

Max hosts per subnet = 2(^n)-2, where n is the #host bits => 2(^5)-2 = 30 hosts per subnet

Q: Which of the following answers lists the decimal notation of the binary number 11100000?

Soln:

*128+64+32=224

Q: What is the first usable host IP address on the 172.26.56.110/27 network?

Soln:

172.X.X.X is a class B network /16 => 27-16 = 11 bits are used for subnetting

Setting all subnetting bits and host ID bits to 0: 172.26.0.0 is the network address of the first network

172.26.   11111111   111 00000 is the broadcast address of the last network

172.26.   00000000   001 00000 is the network address of the second network

Second network is: 172.26.0.32 => A new network will be defined every 32 IP addresses

In this case, the third octet will remain .56 and we will focus on the 4th octet

So, we need to figure out where .110 falls within the repeating 32 pattern

32   64   96 (110) 128

So, 172.26.56.110 is on the 172.26.56.96/27 network (this is the network address)

So, the first usable host IP address on that network is 172.56.56.97

Q: Which of the following answers lists the binary notation of the decimal number 252?

Soln:

252 = 255 minus 3. So, figure out which binary bits need to be turned off (made 0s) to equal the decimal 3, *it's the last two bits

11111100

Q: What is the maximum number of hosts per subnet for the 10.47.255.1/20 network?

Soln:

Since this is a /20 network, then 12 bits are being used for IP addresses on each subnet

Max number of hosts = 2(^n)-2, where n = # of bits used for IP addressing => 2(^12)-2

…Remember that 2^7 is 128 so 12-7 IP addressing bits = 5 => 2^5 = 32x128 = 4096-2 = 4094

Q: What is the maximum valid range of IP addresses that can be assigned to hosts on the 192.168.100.248 255.255.255.248 network?

Soln:

192.X.X.X is a class C network /24

255.255.255.248 is 11111000 in the last octet = /29

So, we only need to look at the last octet

00000 000 is the network address of the first network   192.168.100.0

00001 000 is the network address of the second network   192.168.100.8

The pattern will repeat every 8 IP addresses. The last octet value of the IP address we are concerned with is 248. Since 255 is the last possible IP address (adding 1 to 255 is the IP address of the next network) in that octet, then .248 (255-7) is the network address of this network. Since the first and last address of the range are reserved, the usable range is 192.168.100.249-254

Q: Which of the following answers lists the broadcast address for the 192.168.50.155/20 network?

Soln:

192.X.X.X is a class C network /24 so 4 bits are being used for subnetting. *So, the networks will repeat every 2^4 = 16 decimal digits in the 3rd octet.

50/16=3.125, So, 3x16=48, which is the third octet network address. The next network address will be 48+16 = 64. Since .50 is on that network (between 48 and 64), the broadcast address is the address 1 below the next network address.

192.168.63.255

Q: Which of the following answers refer to the characteristic features of the 10.0.0.0 – 10.255.255.255 IPv4 address space?

Soln: Class A range, non-routable

Q: What is the last usable host IP address on the 192.168.32.9/30 network?

Soln:

192.X.X.X is a class C address /24

192.168.32   111111 00 /30, where 1s indicate the subnetting bits. 192.168.32.0 is the first network

So, if we increment the subnetting bits, from all 0s, by 1 we will get the address of the second network

192.168.32   000001 00

192.168.32.4   This pattern will repeat (the next network address is 192.168.32.8)

So, we need to figure out where 192.168.32.9 falls on that pattern. It is between 8 and 12

192.168.32.8 is a network address and the next network address is 192.168.32.12

Accounting for the bcst address, the last usable IP address on the 192.168.32.9 network is 192.168.32.10

Q: What is the binary representation of the 255.255.128.0 subnet mask?

Soln: *

11111111   11111111   10000000   00000000

Q: In IPv4 addressing, the leading octet of an IP address with a value of 1 through 126 denotes that the IP address within that range belongs to the:

Soln: Class A address space

Q: What is the network address for the 154.24.67.147/22 host?

Soln:

154.X.X.X is a class B address /16

So, the subnet bits are: 154.24   XXXXXX 00   00000000

So, if we increment the subnet bits by 1 we get: 154.24   000001 00   00000000

= 154.24.4.0 -> So, the third octet will increment by 4 (for every new network address)

67/4 = 16.75 so 16*4 = 64. The network address of the 154.24.67.147 host is 154.24.64.0

Q: Which of the following answers lists the CIDR notation for the 255.255.224.0 subnet mask?

Soln:

11111111   11111111   11100000   00000000

/19

Q: Which of the following answers list the characteristic features of the 172.16.0.0 -172.31.255.255 IPv4 address space?

Soln: Class B, non-routable

Q: What is the first valid host address for a node residing in the 10.119.136.143/20 network?

Soln:

10.X.X.X is a class A address /8

So, 20-8=12 bits are being used for a subnet mask

11111111   XXXXXXXX   XXXX 0000   00000000

Increase the subnet bits from 0 to 1

10.   00000000   0001 0000   .0

= 10.0.16.0 is the second network -> This pattern will increase every 16 IP addresses. So, we need to figure out which network 10.119.136.X is on.

136/16 =8.5 So, 7*16=128 The network address for the host we are concerned with is 10.119.128.0, so the first valid host on that network is 10.119.128.1

Q: Which of the following is an example of a valid subnet mask?

Soln: None

Q: Which of the following answers lists the CIDR notation of the 255.255.255.224 subnet mask?

Soln: *

11111111   11111111   11111111   11100000

/27

Q: What is the binary representation of the 255.254.0.0 subnet mask?

Soln:

       *128+64+32+16+8+4+2=254

1111111   11111110   00000000   00000000

Q: Which of the following answers list the characteristic features of the 192.168.0.0-192.168.255.255 IP address space?

Soln: Class C, non-routable

Q: What is the leading octet value range for an IPv4 address belonging to a class B network?

Soln: 128-191

Q: In IPv4 addressing, the leading octet of an IP address with a value of 192 through 223 denotes that the IP address within that range belongs to the:

Soln: Class C

Q: Which of the following answers lists the CIDR notation of the 255.192.0.0 subnet mask?

Soln:

*128+64=192

11111111   11000000   00000000   00000000

/10

Q: Which of the following answers refer to the leading octet value range and class of the IPv4 multicast address block?

Soln: 224-239, Class D

Q: Which of the following answers lists the broadcast address for the 46.28.247.103/10 network?

Soln:

46.X.X.X is a class A address /8

So, 2 bits are being used for subnetting

46.   XX 000000   00000000   00000000

So, 46.0.0.0 is the first network address. Increment the subnet bits by 1 to find the second network address.

46.   01 000000   00000000   00000000

= 46.64.0.0 -> 46.28.X.X falls within the first network.

So, the broadcast address is 46.63.255.255

Q: What is the network address for the 192.168.223.15 255.255.255.252 host?

Soln:

*This is a /30 subnet mask

192.X.X.X is a class C network /24

So, let's find the first and second network addresses

192.168.223   000000 00   192.168.22.0

192.168.223   000001 00   192.168.22.4

So, 192.168.223.15 is on the 192.168.223.12 network

Q: Compared to the number of all IPv4 addresses available per subnet, the total number of usable IPv4 addresses that can be assigned to hosts from the pool is reduced by two. Those two addresses that cannot be assigned to hosts are used as:

Soln: Network Address, Broadcast Address

Q: What is the maximum valid range for IP addresses that can be assigned to hosts on the 134.170.185.46 255.255.128.0 network?

134.X.X.X is a class B network /16

255.255.128.0 is /17 so, one bit (and this first bit in the second octet) is being used for subnetting

So, the second (and only other) network is 134.170.128.0

So, the valid range is <u>134.170.128.1 – 134.170.255.254</u>