

# 4.2.8 Practice Questions

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Date: 2/10/2025, 11:52:40 AM • Time Spent: 03:03

Score: 100%

Passing Score: 80%



Your network has a network address of 172.17.0.0 with a subnet mask of 255.255.255.0.

Which of the following are true concerning this network? (Select two.)

- 172.17.0.255 is the network broadcast address.
- 256 IP addresses can be assigned to host devices.
- 254 IP addresses can be assigned to host devices.
- 172.17.255.255 is the network broadcast address.
- 172.17.0.1 is reserved for the default gateway.

### Explanation

A Class B address can be subnetted to provide additional subnet addresses. Notice how, by using a custom subnet mask, the Class B address looks like a Class C address:

- Network address: 172.17.0.0
- Subnet mask: 255.255.255.0
- Number of subnets: 256
- Number of hosts per subnet: 254 per subnet
- Subnet addresses: 172.17.1.0, 172.17.2.0, 172.17.3.0, and so on
- Host address ranges: 172.17.1.1 to 172.17.1.254, 172.17.2.1 to 172.17.2.254, 172.17.3.1 to 172.17.3.254, and so on

### References

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Question 2.

✓ Correct

You have two subnets on your private network, one with a 20-bit mask, and another with a 22-bit mask. How many available host addresses are there on each subnet? (Select two.)

- 510
- 512
- 1022
- 1024
- 2046
- 2048
- 4094
- 4096

**Explanation**

Subnets with masks shorter than 24 bits have the following number of hosts:

- 23-bits = 510
- 22-bits = 1022
- 21-bits = 2046
- 20-bits = 4094
- 19-bits = 8190
- 18-bits = 16382
- 17-bits = 32766

To calculate the number of hosts per subnet for masks shorter than 24-bits:

1. Start with a 24-bit mask and a magic number of 256.
2. For each bit you remove from the mask, double the magic number. For example, a 23-bit mask has a magic number of 512.
3. For each subnet, subtract the two reserved addresses (the subnet address and the broadcast address) from the magic number. For example, for a 23-bit mask, there are  $512 - 2 = 510$  hosts.

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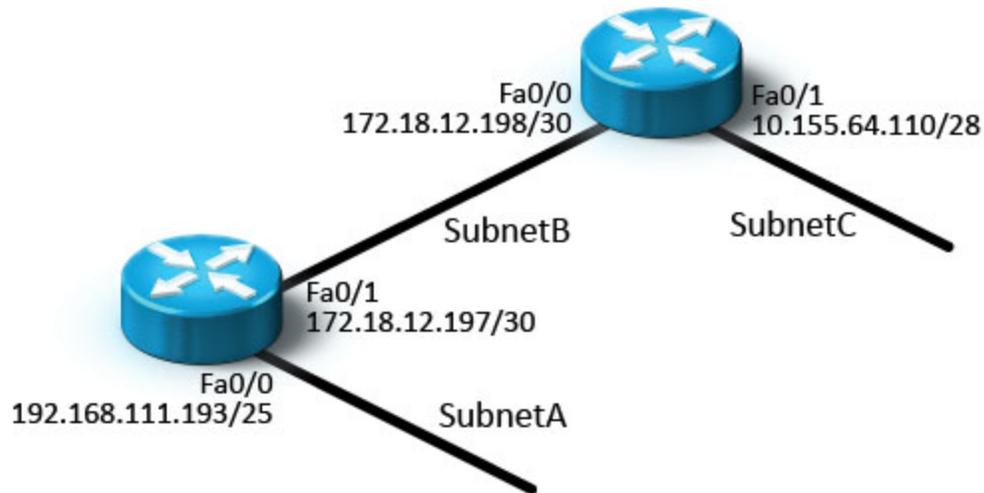
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Question 3.

✓ Correct

You have a small network with three subnets as shown in the exhibit. IP addresses for each router interface are also indicated in the exhibit.

How many IP addresses on each subnet remain that can be assigned to hosts?



- SubnetA = 61, SubnetB = 0, SubnetC = 5
- SubnetA = 126, SubnetB = 2, SubnetC = 14
- SubnetA = 254, SubnetB = 6, SubnetC = 30
- SubnetA = 125, SubnetB = 0, SubnetC = 13
- SubnetA = 253, SubnetB = 4, SubnetC = 29
- SubnetA = 62, SubnetB = 0, SubnetC = 6

**Explanation**

The scenario asks you for how many addresses remain that can be assigned to hosts. In this scenario, remember to remove the following addresses from each range:

- The subnet address.
- The broadcast address.
- Addresses assigned to the router interfaces. For Subnets A and C, one address on the subnet is assigned. For SubnetB, two addresses have been assigned.

The following mask values provide for the following number of hosts:

- Mask of /25 provides 126 host addresses, with one of those being used by the router.
- Mask of /30 provides for two host addresses. Both addresses are used by routers.
- Mask of /28 provides for 14 host addresses, with one of those being used by the router.

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Question 4.

✓ Correct

Drag each binary subnet mask on the left to its appropriate decimal equivalent on the right.

255.0.0.0

✓ 11111111.00000000.00000000.00000000

255.255.255.128

✓ 11111111.11111111.11111111.10000000

255.224.0.0

✓ 11111111.11100000.00000000.00000000

255.255.0.0

✓ 11111111.11111111.00000000.00000000

255.255.255.252

✓ 11111111.11111111.11111111.11111100

**Explanation**

To perform subnetting operations, you will need to be proficient at converting decimal and binary numbers. When working with IP addresses, work with each octet separately. The following shows the decimal value for various binary values with a single 1 bit:

- 10000000: 128
- 01000000: 64
- 00100000: 32
- 00010000: 16
- 00001000: 8
- 00000100: 4
- 00000010: 2
- 00000001: 1

To find the decimal value of a number with multiple 1 bits, simply add the decimal value of the bits together. In this example:

- 11111111.11111111.00000000.00000000 = 255.255.0.0
- 11111111.00000000.00000000.00000000 = 255.0.0.0
- 11111111.11111111.11111111.10000000 = 255.255.255.128
- 11111111.11111111.11111111.11111100 = 255.255.255.252
- 11111111.11100000.00000000.00000000 = 255.224.0.0

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You have a network address of 132.66.0.0 and a subnet mask of 255.255.224.0.

Which four of the following are valid subnet addresses?

- 132.66.192.0
- 132.98.0.0
- 132.66.255.0
- 132.66.0.0
- 132.130.0.0
- 132.66.96.0
- 132.66.224.0

### Explanation

To determine the valid subnet addresses, complete the following steps:

1. Convert the custom subnet mask value to binary (224 = 11100000).
2. Select the rightmost masked bit (100000).
3. Convert this bit to decimal. This is the increment value (32).
4. Add the increment value to the network address up to the subnet mask value. In this example, the possible subnet addresses are:

- 132.66.0.0
- 132.66.32.0
- 132.66.64.0
- 132.66.96.0
- 132.66.128.0
- 132.66.160.0
- 132.66.192.0
- 132.66.224.0

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You have a network address of 201.79.187.0 and a subnet mask of 255.255.255.192.

Which three of the following are valid host addresses for subnet 201.79.187.128?

- 201.79.187.166
- 201.79.187.33
- 201.79.187.12
- 201.79.187.196
- 201.79.187.189
- 201.79.187.132

### Explanation

You can calculate the range of host addresses by completing the following steps:

1. Convert the octet of interest in the subnet mask to binary (11000000).
2. Convert the octet of interest in the subnet address to binary (10000000).
3. In the subnet address, set all host bits to 1 (10111111). This is the broadcast address.
4. Convert the broadcast address to decimal (201.79.187.191).
5. Valid host addresses are one more than the subnet address (201.79.187.129) and one less than the broadcast address (201.79.187.190).

### References

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While calculating how many subnets are available for a given IP address and subnet mask, when should you use the  $2^n - 2$  formula? (Select two.)

- The network uses a classless routing protocol, such as RIP version 2, EIGRP, or OSPF.
- Variable-length Subnet Mask (VLSM) is used.
- The network uses a classful routing protocol, such as RIP version 1 or IGRP.
- The **ip subnet zero** command is configured.
- The **no ip subnet zero** command is configured.

### Explanation

Use  $2^n - 2$  if the network uses a classful routing protocol, such as RIP version 1 or IGRP, or if the **no ip subnet zero** command is configured.

Use  $2^n$  if:

- The network uses a classless routing protocol, such as RIP version 2, EIGRP, or OSPF.
- The **ip subnet zero** command is configured.
- Variable-length Subnet Mask (VLSM) is used.
- No network details are provided.

### References

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You have a network address of 202.200.55.0 with a subnet mask of 255.255.255.224.

Which of the following is the broadcast address for subnet 202.200.55.96?

- 202.200.55.1
- 202.200.55.96
- 202.200.55.97
- 202.200.55.111
- 202.200.55.127
- 202.200.55.255

### Explanation

The broadcast address for this subnet is 202.200.55.127. The broadcast address is always the last valid IP address in the host range for the subnet. Use the following process to determine the broadcast address.

1. Convert the last octet of the subnet mask to binary (1110000).
2. Convert the last octet of the subnet address to binary (00000000).
3. In the subnet address, set all host bits to 1 (00011111).
4. Convert the address to decimal (127). This is the broadcast address.

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Your network has been assigned 168.11.0.0 as the network address. You have determined that you need 70 subnets.

Which subnet mask value should you select to provide 70 subnets?

- 255.255.252.0
- 255.255.248.0
- 255.255.240.0
- 255.255.254.0
- 255.255.255.0

### Explanation

Use 255.255.254.0 as the subnet mask. This masks seven bits in the network address for subnet addresses. Using the formula ( $2^m$ ), seven masked bits provide  $2^7$ , or up to 128 subnets.

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You need to connect a router to a subnet. The subnet uses the IP address 192.168.12.0/26. You are instructed to assign the last IP address on the subnet to the router.

Which IP address will you use?

- 192.168.12.255
- 192.168.12.254
- 192.168.12.63
- 192.168.12.62
- 192.168.12.30
- 192.168.12.31
- 192.168.12.15
- 192.168.12.14

### Explanation

The last IP address on subnet 192.168.12.0/26 that can be assigned to a host is 192.168.12.62. You cannot use 192.168.12.63 because this is the broadcast address. With the 26-bit mask, valid host addresses are between 192.168.12.1 and 192.168.12.62.

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