Understand Subnetting with the the help of practical Examples..

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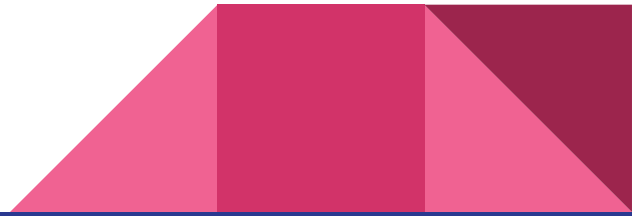
Question 1:

You have been allocated a class A network address of **29.0.0.0**. You need to create at least 20 networks and each network will support a minimum of 160 hosts. Would the following two subnet masks Work?

255.255.0.0 and or **255.255.255.0**



Answer

Yes both would work.

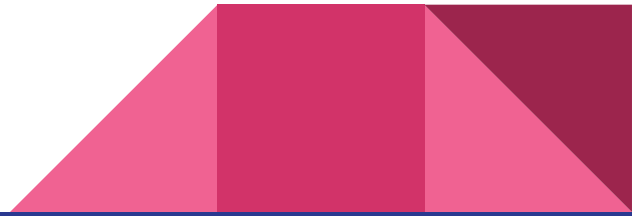
Mask **255.255.0.0** has 8 bits for the subnet and 16 bits for the host.

8 bits would accommodate 2^8=256 subnets

16 bits would accommodate 2^{16}= over 64000 hosts

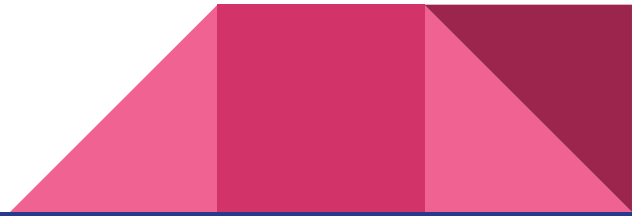
Mask 255.255.255.0 has 16 bits for the subnet and 8 bits of the host.

Have possible 2^8 -2 hosts =254 which is enough



Question - 2

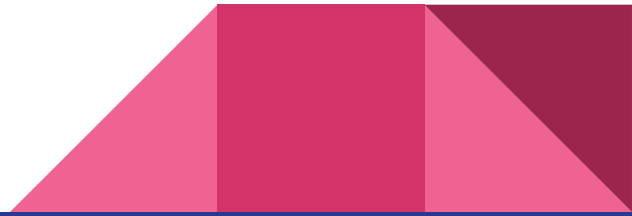
Write the IP address 222.1.1.20 mask 255.255.255.192 in CIDR notation



Answer :

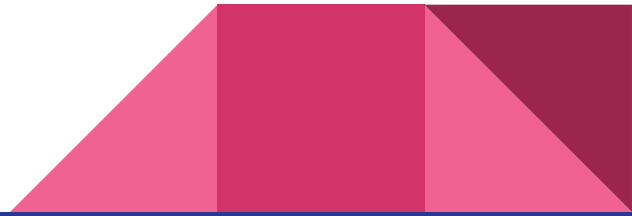
Decimal 192 =11000000 binary which means that 2 bits of this octet are used for the subnet. Now add the 24 bits 255.255.255 and we have 26 bits. So we write:

222.1.1.20/26



Question - 3

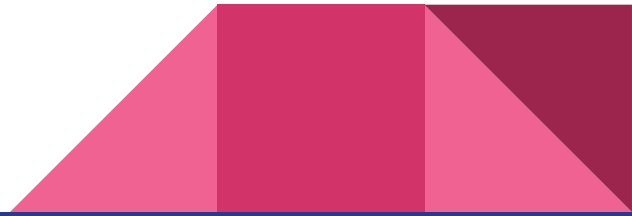
Write the IP address 135.1.1.25 mask 255.255. 248.0 in CIDR notation



Answer

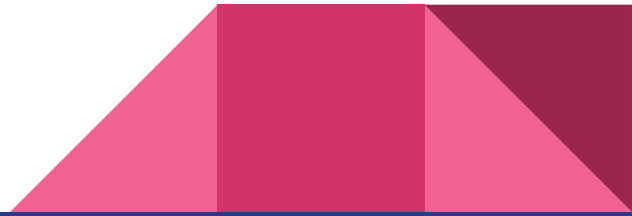
Decimal 248 =11111000 binary which means that 5 bits of this octet are used for the subnet. Now add the 16 bits 255.255. and we have 21 bits. So we write:

135..1.1.25/21



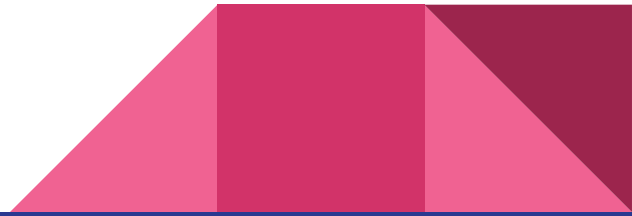
Question 3

You have been allocated a class C network address of 211.1.1.0 and are using the default subnet mask of 255.255.255.0 how may hosts can you have?



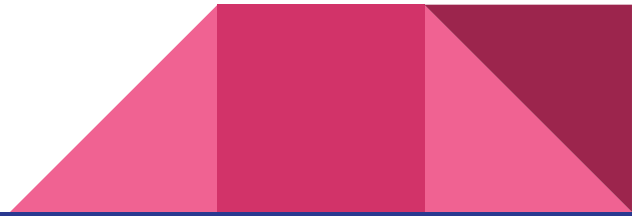
Answer

A class C address has 8 bits of the host which will give 28 -2 =254 hosts



Question 4

Subnet the Class C IP Address 195.1.1.0 So that you have 10 subnets each with a maximum 12 hosts on each subnet. List the Address on host 1 on subnet 0,1,2,3,10



Answer

Current mask= 255.255.255.0

Bits needs for 10 subnets =4 =24 =16 possible subnets

Bits needs for 12 hosts = 4 = 24 = 16-2=14 possible hosts.

So our mask in binary =**11110000**= **240** decimal

Final Mask =**255.255.255.240**

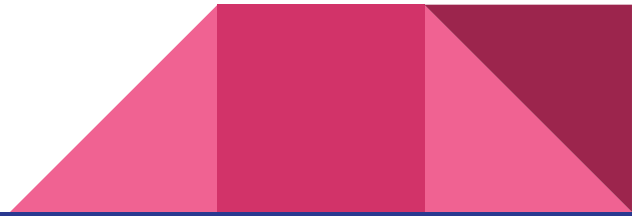
Hosts on Subnets 0,1,2,3,10

- Subnet 0 host 1 IP address = 195.1.1.1 **0000 0001**
- Subnet 1 host 1 IP address = 195.1.1.17 **0001 0001**
- Subnet 2 host 1 IP address = 195.1.1.33 **0010 0001**
- Subnet 3 host 1 IP address = 195.1.1.49 **0011 0001**
- Subnet 10 host 1 IP address = 195.1.1.161 **1010 0001**

Question 5

Subnet the Class C IP Address 195.1.1.0 So that you have at least 2 subnets each subnet must have room for 48 hosts .

What are the two possible subnet masks?



Current mask= 255.255.255.0

Bits needs for 48 hosts = 6 = 26 = 64-2=62 possible hosts.

Bits needs for 2 subnets =1 =21 =2 possible subnets

Total of 7 bits needed so therefore we can use either 1 bit or 2 bits for the subnet. So we could have

1 bit subnet 7 bits hosts or 2 bits subnet 6 bit host

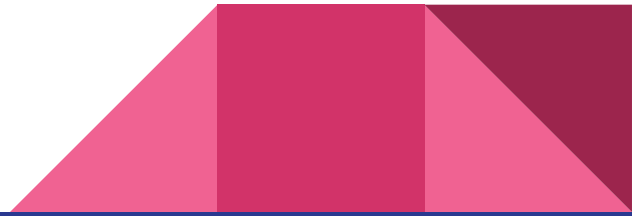
masks are 10000000 and 11000000 =128 decimal and 192 decimal.

Final possible masks are:

255.255.255.128 and **255.255.255.192**

Question 6

Given the subnet Mask **255.255.255.192** What is the host address and subnet of the following IP address 197.1.2.67.



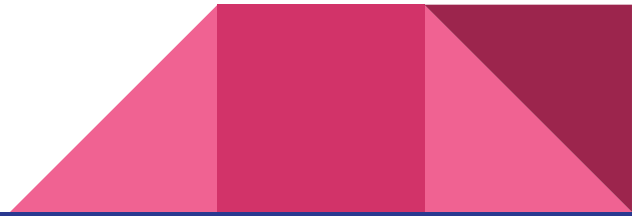
Answer

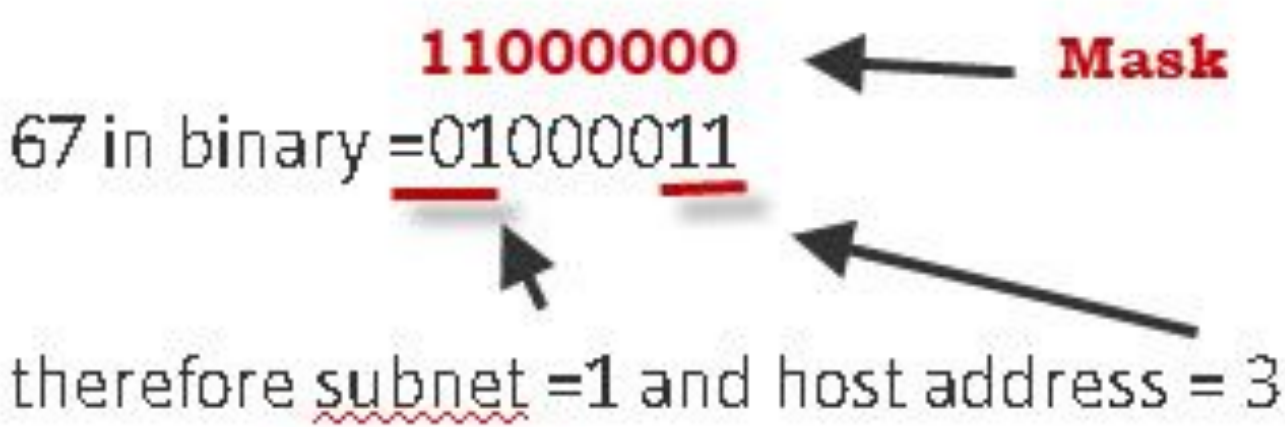
192 in binary =11000000 gives 4 possible subnets of (showing 2 most significant bits):

00,01,10,11

67 in binary =01000011

So Applying Mask:




11000000
Mask
67 in binary =01000011
therefore subnet =1 and host address = 3

Final Question

You are given the IP Address of 193.103.20.0 /24 and need 50 Subnets. How many hosts per network, and total networks do you get once subnetted?

a. 20 Hosts and 50 Subnets

b. 6 Hosts and 64 Subnets

c. 4 Hosts and 50 Subnets

d. 2 Hosts and 64 Subnets