① a) 192.168.100.17 4bits subnetting

Class C => 255.255.255.0

4bits

11111111.11111111.11111111.11110000 /28

255.255.255.240

-256

16

Subnet => 2^4 = 16 subnets

last octet

17/16 = 1 } 192.168.100.16 network address

1·16 = 16

16 - 1 (host) = 15

16 + 15 = 31 } 192.168.100.31 broadcast

range
192.168.100.17
192.168.100.30
=> 14 host

b) 192.168.100.66 3bits subnetting

Class C => 255.255.255.0

.....111 00000 /27

128+64+32 = 224

255.255.255.224

-256

32

Subnet => 2^3 = 8 subnets host => $2^5 - 2 = 30$

66/32 = 2 } 192.168.100.64 network address

2·32 = 64

32 - 1 (subnet) = 31

64 + 31 = 95 } 192.168.100.95 broadcast

range
192.168.100.65
192.168.100.94
=> host 30

c) 172.16.10.5 /20

type B 11111111.11111111.1111'0000.00000000

255.255.240.0

-256

16

Subnets = 2^4 = 16 subnets host => $2^{12} - 2$ = 4094 host

10/16 = 0 } 172.16.0.0 network address

0·16 = 0

range
172.16.0.1
172.16.15.255

172.16.00001111.11111111 => 172.16.15.256 broadcas

d) 172.16.10.33 / 255.255.252.0

-256
4

Type B

Network Host

11111111.11111111.11111100.00000000

Subnets ⇒ 2^6 = 64 host : $2^{10}-2$ = 1022 host

network address [redacted] 172.16.0000 10.00000000

↳ 172.16.8.0

broadcast 172.16.0000 11.111111

↳ 172.16.11.256

② I'm going to use the formula $2^m - 2 \geq$ host

$2^m - 2 \geq 126$ ⇒ so the next near number is $2^7 = 128$

$m = 7$ ⇒ $2^7 - 2 = 126$

Type C network will be the most efficient ⇒ 128 to binary

255.255.255.0

255.255.255.10000000 ⇒ 255.255.255.128

③ Network address ⇒ 192.168.10.0 ⇒ Type C

Subnet ⇒ 255.255.255.192

.11000000

255.255.255.0

255.255.255.11000000
host

Subnets ⇒ 2^2 = 4 subnets host ⇒ 2^6-2 = 62 per subnet

The magic number is 64 ⇒ 256 - 192 = 64

So, if we need 4 networks ⇒ 192.168.10.0 } +64
192.168.10.64 }
192.168.10.128 }
192.168.10.192

④ Mask /27 255.255.255.111 00000 Router IP = 173.32.2.62 PC IP = 173.

so we have 2^3 subnets ⇒ 8 subnets and 2^5-2 host ⇒ 30 host per subnet

The magic number is 256 - 224 = 32.

The 1st network [redacted] 173.32.2.0

2: 173.32.2.32 → router network } Diffrent subnets

3: 173.32.2.64 → PC network

4: 173.32.2.96

:

:

⑤ 25 host/computers per subnet

Type C network

With the host formula $2^n - 2 \geq 25 \Rightarrow 2^5 - 2 = 30$ the most similar

So we will be lefting 5 bits empty => 255 255 255 11100000
255. 255. 255. 224

With the use bits we realice we ca have $2^3 = 8$ subnets, but only 5 are needed

We calculate the magic number 256 - 224 = 32

	address	host range	broadcas
1- Subnet	192.168.162.0	.1 - .30	.31
+32 2- Subnet	192.168.162.32	.33 - .62	.63
3- Subnet	192.168.162.64	.65 - .94	.95
4- Subnet	192.168.162.96	.97 - .126	.127
5- Subnet	192.168.162.128	.129 - .158	.159

We have 3 more subnets but the client only needed 5

⑥ /8 mask

1000 subnets

Type A => private network

$2^n \geq 1000$

$2^{10} = 1024$ => 255.11111111.11000000.00000000 /18

255.255.192.0 => network mask

-256

64 => Magic Number

It is a type A private subnetwork

+64 10.0.0.0 } 1
10.0.64.0
10.0.128.0
10.0.192.0 -> last network per octet
10.1.0.0

10.255.128.0 -> penultimate network
10.255.192.0 -> last network