172.16.0.0/16

THE QUESTION TELLS US we need 2000 HOSTS

So, we figure out how many 2's it takes
must be over
to get OVER 2000..

$$4 \quad 8 \quad 16 \quad 32 \quad 64 \quad 128 \quad 256 \quad 512 \quad 1024 \quad 2048$$
$$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2048$$
$$= 2^{11}$$

If we split up the network we can visualize:

8 bits    8 bits    8 bits    8 bits

172 . 16 . 0 . 0 /16

we figured out we need 11 and because
obviously there is only 8 bits in each
part we have to "borrow" from it's
neighbour like this! :

8     8     adds up to 8   adds up to 11!
               5   3      8

172 . 16 . 0 . 0 /16
N     N    nnnn nhhh . H

before we begin subnetting we
must also change our prefix.
This is easy - you just add whatever
leftover network you have left!

Because we have 5 left over, our new
prefix is /21

# SUBNETTING!

## SUBNET #0

172.16 . 0000 0000 . **0** – network address

172.16 . 0000 0 000 . **1** – the first usable address

TO FIND THE LAST USABLE → SIMPLY 1 all your new hosts and minus 1!

(7)
172.16 . 0000 0 **1111.1111 111 0** – the last usable address
$4+2+1=7$ (254)

(255)
172.16 . **7** . **1111 1111** – Broadcast Address

## SUBNET #1

To move to the ct subnet you simply step up a number:

(8)
172 . 16 . 0000 **1000** . **0** – Network address

172 . 16 . **8** . **1** – first usable

AGAIN WHILE FINDING LAST USABLE —
1 ALL NUMBERS TH MINUS 1 FROM END! (254)

15
172 . 16 . 0000 **1111 .1111 1110** – last usable

172 . 16 . **15** . **255** – Broadcast

we can now see that there is a jump of 7 which should occur every time.

# SUBNET #2

Like before, because the previous step ended on 15, our first will be 16.

0000 1111 — 15
TO
0001 0000 — 16

172.16.16.0 — Network address

172.16.16.1 — First usable address

0001 0000
TO LAST USABLE ADDRESS

172.16.0001 1111.254 — Last usable address

172.16.31.255 - Broadcast address

Carry this on for as long as you can to grasp the concept!. (#5 SUBNETS)