# Custom Subnet Masks

## Problem 1

Number of needed subnets **14**
Number of needed usable hosts **14**
Network Address **192.10.10.0**

Address class _____ *C* _____

Default subnet mask _____ *255 . 255 . 255 . 0* _____

Custom subnet mask _____ *255 . 255 . 255 . 240* _____

Total number of subnets _____ *16* _____

Total number of host addresses _____ *16* _____

Number of usable addresses _____ *14* _____

Number of bits borrowed _____ *4* _____

### Show your work for Problem 1 in the space below.

|  |  |  |  |  | Number of |  |  |  |  | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | — | Hosts |
| Number of Subnets | — | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 256 | |
| | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | — | Binary values |

*192 . 10 . 10 .* 0 0 0 0 | 0 0 0 0

Add the binary value numbers to the left of the line to create the custom subnet mask.

$$\begin{array}{r} 128 \\ 64 \\ 32 \\ +16 \\ \hline 240 \end{array}$$

$$\begin{array}{r} 16 \\ -2 \\ \hline 14 \end{array}$$

Observe the total number of hosts.

Subtract 2 for the number of usable hosts.

# Custom Subnet Masks

## Problem 2

Number of needed subnets **1000**
Number of needed usable hosts **60**
Network Address **165.100.0.0**

Address class _____*B*_____

Default subnet mask ___*255 . 255 . 0 . 0*___

Custom subnet mask ___*255 . 255 . 255 . 192*___

Total number of subnets _____*1,024*_____

Total number of host addresses _____*64*_____

Number of usable addresses _____*62*_____

Number of bits borrowed _____*10*_____

**Show your work for Problem 2 in the space below.**

| Number of Hosts – | 65,536 | 32,768 | 16,384 | 8,192 | 4,096 | 2,048 | 1,024 | 512 | | . 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Subnets – | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 256. | | 512 | 1024 | 2048 | 4,096 | 8,192 | 16,384 | 32,768 | 65,536 |
| Binary values – | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 . | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| *165 . 100 .* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0 .* | | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |

Add the binary value numbers to the left of the line to create the custom subnet mask.

```
128      128
 64     +64
 32      192
 16
  8
  4
  2
 +1
255
```

Observe the total number of hosts.

```
 64
 -2
 62
```

Subtract 2 for the number of usable hosts.

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# Custom Subnet Masks

## Problem 3

Network Address **148.75.0.0 /26**

Address class ___B___

Default subnet mask ___255 . 255 . 0 . 0___

Custom subnet mask ___255 . 255 . 255 . 192___

Total number of subnets ___1,024___

Total number of host addresses ___64___

Number of usable addresses ___62___

Number of bits borrowed ___10___

## Show your work for Problem 3 in the space below.

| Number of Hosts – | 65,536 | 32,768 | 16,384 | 8,192 | 4,096 | 2,048 | 1,024 | 512 | . 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Subnets – | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 256 . | 512 | 1024 | 2048 | 4096 | 8,192 | 16,384 | 32,768 | 65,536 |
| Binary values – | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 . | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

148 . 75 . 0  0  0  0  0  0  0  0 . 0  0 | 0  0  0  0  0  0

```
        128    128
         64    +64
         32    192
         16
          8              64    Observe the total number of
          4             -2     hosts.
          2             62     Subtract 2 for the number of
         +1                    usable hosts.
        255    1024
               -2
               1,022
```

Add the binary value numbers to the left of the line to create the custom subnet mask.

Subtract 2 for the total number of subnets to get the usable number of subnets.

# Custom Subnet Masks

## Problem 4

Number of needed subnets **6**
Number of needed usable hosts **30**
Network Address **195.85.8.0**

Address class ____C____

Default subnet mask ___255.255.255.0_____

Custom subnet mask ___255.255.255.224_____

Total number of subnets ___8_____

Total number of host addresses ___32_____

Number of usable addresses ___30_____

Number of bits borrowed ___3_____

**Show your work for Problem 5 in the space below.**

| | | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | – | Number of Hosts |
| Number of Subnets | – | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 256 | | |
| | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | – | Binary values |

195 . 85 . 8 . 0 0 0 | 0 0 0 0 0

# Custom Subnet Masks

## Problem 5

Number of needed subnets **6**
Number of needed usable hosts **30**
Network Address **210.100.56.0**

Address class __C__

Default subnet mask __255.255.255.0__
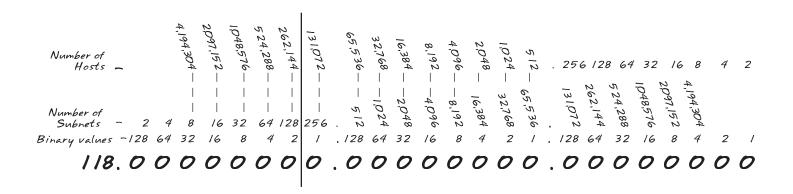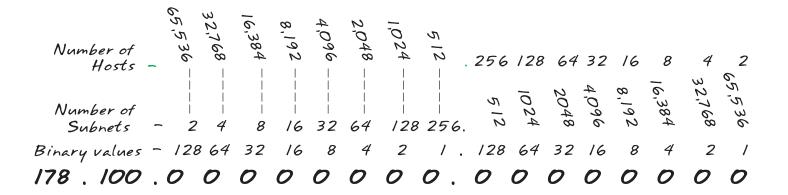
Custom subnet mask __255.255.255.224__

Total number of subnets __8__

Total number of host addresses __32__

Number of usable addresses __30__

Number of bits borrowed __3__

**Show your work for Problem 4 in the space below.**

|  | | | | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 | – | Number of Hosts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Subnets | – | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 256 | | | | |
| | | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | – | Binary values | | |

210 . 100 . 56 . 0  0  0 | 0  0  0  0  0

# Custom Subnet Masks

## Problem 6

Number of needed subnets **126**
Number of needed usable hosts **131,070**
Network Address **118.0.0.0**

Address class ___A___

Default subnet mask __255.0.0.0__

Custom subnet mask __255.254.0.0__

Total number of subnets __128__

Total number of host addresses __131,072__

Number of usable addresses __131,070__

Number of bits borrowed __17__

**Show your work for Problem 6 in the space below.**

| Number of Hosts | | 4,194,304 | 2,097,152 | 1,048,576 | 524,288 | 262,144 | 131,072 | 65,536 | 32,768 | 16,384 | 8,192 | 4,096 | 2,048 | 1,024 | 512 | | 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 |
| Number of Subnets | — | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 256 | 512 | 1,024 | 2,048 | 4,096 | 8,192 | 16,384 | 32,768 | 65,536 | 131,072 | 262,144 | 524,288 | 1,048,576 | 2,097,152 | 4,194,304 |
| Binary values | −128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | .128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | .128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |

118 . 0 0 0 0 0 0 0 | 0 . 0 0 0 0 0 0 0 0 . 0 0 0 0 0 0 0 0

# Custom Subnet Masks

## Problem 7

Number of needed subnets **2000**
Number of needed usable hosts **15**
Network Address **178.100.0.0**

Address class ___B___

Default subnet mask ___255.255.0.0___

Custom subnet mask ___255.255.255.224___

Total number of subnets ___2048___

Total number of host addresses ___32___

Number of usable addresses ___30___

Number of bits borrowed ___11___

### Show your work for Problem 7 in the space below.

| Number of Hosts – | 65,536 | 32,768 | 16,384 | 8,192 | 4,096 | 2,048 | 1,024 | 512 | . 256 | 128 | 64 | 32 | 16 | 8 | 4 | 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Subnets – | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 256. | 512 | 1024 | 2048 | 4,096 | 8,192 | 16,384 | 32,768 | 65,536 |
| Binary values – | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 . | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 178 . 100 . 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Custom Subnet Masks

## Problem 8

Number of needed subnets **3**
Number of needed usable hosts **45**
Network Address **200.175.14.0**

Address class _C_____

Default subnet mask __255.255.255.0_____

Custom subnet mask __255.255.255.192_____

Total number of subnets ____4_____

Total number of host addresses ____64_____

Number of usable addresses ____62_____

Number of bits borrowed ____2_____

**Show your work for Problem 8 in the space below.**

# Custom Subnet Masks

## Problem 9

Number of needed subnets **60**
Number of needed usable hosts **1,000**
Network Address **128.77.0.0**

Address class __B_____

Default subnet mask __255.255.0.0_____

Custom subnet mask __255.255.252.0_____

Total number of subnets ____64_____

Total number of host addresses ____1024_____

Number of usable addresses ____1022_____

Number of bits borrowed ____6_____

**Show your work for Problem 9 in the space below.**

# Custom Subnet Masks

## Problem 10

Number of needed usable hosts **60**

Network Address **198.100.10.0**

Address class __C_____

Default subnet mask __255.255.255.0_____

Custom subnet mask __255.255.255.252_____

Total number of subnets __64_____

Total number of host addresses __4_____

Number of usable addresses __2_____

Number of bits borrowed __6_____

**Show your work for Problem 10 in the space below.**

# Custom Subnet Masks

## Problem 11

Number of needed subnets **250**
Network Address **101.0.0.0**

Address class ___A____

Default subnet mask ___255.0.0.0_____

Custom subnet mask ___255.255.0.0_____

Total number of subnets ___256_____

Total number of host addresses ___65,536_____

Number of usable addresses ___65,534_____

Number of bits borrowed ___8_____

**Show your work for <u>Problem 11</u> in the space below.**

# Custom Subnet Masks

## Problem 12

Number of needed subnets **5**

Network Address **218.35.50.0**

Address class  C_____

Default subnet mask  255.255.255.0_____

Custom subnet mask ___255.255.255.224_____

Total number of subnets __8_____

Total number of host addresses __32_____

Number of usable addresses __30_____

Number of bits borrowed __3_____

**Show your work for Problem 12 in the space below.**

# Custom Subnet Masks

## Problem 13

Number of needed usable hosts **25**

Network Address **218.35.50.0**

Address class  C

Default subnet mask  255.255.255.0

Custom subnet mask  255.255.255.248

Total number of subnets  32

Total number of host addresses  8

Number of usable addresses  6

Number of bits borrowed  5

**Show your work for <u>Problem 13</u> in the space below.**

# Custom Subnet Masks

## Problem 14

Number of needed subnets **10**

Network Address **172.59.0.0**

Address class  B_____

Default subnet mask __255.255.0.0_____

Custom subnet mask __255.255.240.0_____

Total number of subnets __16_____

Total number of host addresses __4096_____

Number of usable addresses __4094_____

Number of bits borrowed __4_____

**Show your work for <u>Problem 14</u> in the space below.**

# Custom Subnet Masks

## Problem 15

Number of needed usable hosts **50**

Network Address **172.59.0.0**

Address class __B_____

Default subnet mask __255.255.0.0_____

Custom subnet mask __255.255.252.0_____

Total number of subnets __64_____

Total number of host addresses __1024_____

Number of usable addresses __1022_____

Number of bits borrowed __6_____

**Show your work for <u>Problem 15</u> in the space below.**

# Custom Subnet Masks

## Problem 16

Number of needed usable hosts **29**

Network Address **23.0.0.0**

Address class __A_____

Default subnet mask __255.0.0.0_____

Custom subnet mask __255.248.0.0_____

Total number of subnets __32_____

Total number of host addresses __2048_____

Number of usable addresses __2046_____

Number of bits borrowed __5_____

**Show your work for Problem 16 in the space below.**