

**Subnetting Asssingment 1 - Solutions**  
 CIS 81 (100 points)

**Problem 1**

<b>Host IP Address</b>	172.30.1.33
<b>Major Network Mask</b>	255.255.0.0
Major (Base) Network Address	172.30.0.0
Major Network Broadcast Address	172.30.255.255
Total Number of Host Bits	16 bits
Number of Hosts	65,534 hosts
<b>Subnet Mask</b>	255.255.255.0
Number of Subnet Bits	8 bits
Number of Usable Subnets (zero subnet used)	255 subnets
Number of Host Bits per Subnet	8 bits
Number of Usable Hosts per Subnet	254 hosts per subnet
Subnet Address for this IP Address	172.30.1.0
IP Address of First Host on this Subnet	172.30.1.0
IP Address of Last Host on this Subnet	172.30.1.254
Broadcast Address for this Subnet	172.30.1.255

**Major Network Information**

172.30.1.33	10101100	00011110	00000001	00100001
255.255.0.0	11111111	11111111	00000000	00000000
<b>Network Address</b>			↑	
172.30.0.0	10101100	00011110	00000000	00000000
<b>Network Broadcast Address</b>			↑	
172.30.255.255	10101100	00011110	11111111	11111111

16 host bits  
 $2^{16} - 2 = 65,536 - 2 = 65,534$  hosts

**Subnet Information**

172.30.1.33	10101100	00011110	00000001	00100001
255.255.255.0	11111111	11111111	11111111	00000000
<b>Subnet Address</b>			↑	
172.30.1.0	10101100	00011110	00000001	00000000
<b>First Host of this subnet</b>			↑	
172.30.1.1	10101100	00011110	00000001	00000001
<b>Last Host of this subnet</b>			↑	
172.30.1.254	10101100	00011110	00000001	11111110
<b>Broadcast of this subnet</b>			↑	
172.30.1.255	10101100	00011110	00000001	11111111

Subnets: 8 subnet bits,  $2^8 - 1 = 256 - 1 = 255$  subnets  
 Hosts: 8 host bits,  $2^8 - 2 = 256 - 2 = 254$  hosts per subnet

**Subnetting Asssingment 1 - Solutions**  
 CIS 81 (100 points)

**Problem 2**

<b>Host IP Address</b>	172.30.1.33
<b>Major Network Mask</b>	255.255.255.0
Major (Base) Network Address	172.30.1.0
Major Network Broadcast Address	172.30.1.255
Total Number of Host Bits	254 hosts
Number of Hosts	
<b>Subnet Mask</b>	255.255.255.252
Number of Subnet Bits	6 bits
Number of Usable Subnets (zero subnet used)	63 subnets
Number of Host Bits per Subnet	2 bits
Number of Usable Hosts per Subnet	2 hosts per subnet
Subnet Address for this IP Address	172.30.1.32
IP Address of First Host on this Subnet	172.30.1.33
IP Address of Last Host on this Subnet	172.30.1.34
Broadcast Address for this Subnet	172.30.1.35

**Major Network Information**

172.30.1.33	10101100	00011110	00000001	00100001
255.255.255.0	11111111	11111111	11111111	00000000
<b>Network Address</b>				
172.30.1.0	10101100	00011110	00000001	00000000
<b>Network Broadcast Address</b>				
172.30.1.255	10101100	00011110	00000001	11111111

8 host bits  
 $2^8 - 2 = 256 - 2 = 254$  hosts

**Subnet Information**

172.30.1.33	10101100	00011110	00000001	00100001
255.255.255.252	11111111	11111111	11111111	11111100
<b>Subnet Address</b>				
172.30.1.32	10101100	00011110	00000001	00100000
<b>First Host of this subnet</b>				
172.30.1.33	10101100	00011110	00000001	00100001
<b>Last Host of this subnet</b>				
172.30.1.34	10101100	00011110	00000001	00100010
<b>Broadcast of this subnet</b>				
172.30.1.35	10101100	00011110	00000001	00100011

Subnets: 6 subnet bits,  $2^6 - 1 = 64 - 1 = 63$  subnets  
 Hosts: 2 host bits,  $2^2 - 2 = 4 - 2 = 2$  hosts per subnet

**Subnetting Asssingment 1 - Solutions**  
 CIS 81 (100 points)

**Problem 3**

<b>Host IP Address</b>	192.192.10.234
<b>Major Network Mask</b>	255.255.255.0
Major (Base) Network Address	192.192.10.0
Major Network Broadcast Address	192.192.10.255
Total Number of Host Bits	8 bits
Number of Hosts	254 hosts
<b>Subnet Mask</b>	255.255.255.248
Number of Subnet Bits	5 bits
Number of Usable Subnets (zero subnet used)	31 subnets
Number of Host Bits per Subnet	3 bits
Number of Usable Hosts per Subnet	6 hosts per subnet
Subnet Address for this IP Address	192.192.10.232
IP Address of First Host on this Subnet	192.192.10.233
IP Address of Last Host on this Subnet	192.192.10.238
Broadcast Address for this Subnet	192.192.10.239

**Major Network Information**

192.192.10.234	11000000	11000000	00001010	11101010
255.255.255.0	11111111	11111111	11111111	00000000
<b>Network Address</b>				
192.192.10.0	11000000	11000000	00001010	00000000
<b>Network Broadcast Address</b>				
192.192.10.255	11000000	11000000	00001010	11111111

8 host bits  
 $2^8 - 2 = 256 - 2 = 254$  hosts

**Subnet Information**

192.192.10.234	11000000	11000000	00001010	11101010
255.255.255.248	11111111	11111111	11111111	11111000
<b>Subnet Address</b>				
192.192.10.232	11000000	11000000	00001010	11101000
<b>First Host of this subnet</b>				
192.192.10.233	11000000	11000000	00001010	11101001
<b>Last Host of this subnet</b>				
192.192.10.238	11000000	11000000	00001010	11101110
<b>Broadcast of this subnet</b>				
192.192.10.239	11000000	11000000	00001010	11101111

Subnets: 5 subnet bits,  $2^5 - 1 = 32 - 1 = 31$  subnets  
 Hosts: 3 host bits,  $2^3 - 2 = 8 - 2 = 6$  hosts per subnet

**Subnetting Asssingment 1 - Solutions**  
 CIS 81 (100 points)

**Problem 4**

<b>Host IP Address</b>	171.68.99.71
<b>Major Network Mask</b>	255.255.0.0
Major (Base) Network Address	171.68.0.0
Major Network Broadcast Address	171.68.255.255
Total Number of Host Bits	16 host bits
Number of Hosts	65,534 hosts
<b>Subnet Mask</b>	255.255.240.0
Number of Subnet Bits	4 bits
Number of Usable Subnets (zero subnet used)	15 subnets
Number of Host Bits per Subnet	12 bits
Number of Usable Hosts per Subnet	4,094 hosts per subnet
Subnet Address for this IP Address	171.68.96.0
IP Address of First Host on this Subnet	171.68.96.1
IP Address of Last Host on this Subnet	171.68.111.254
Broadcast Address for this Subnet	171.68.111.255

**Major Network Information**

171.68.99.71	10101011	01000100	01100011	01000111
255.255.0.0	11111111	11111111	00000000	00000000
<b>Network Address</b>			▲	
171.68.0.0	10101011	01000100	00000000	00000000
<b>Network Broadcast Address</b>			⋮	
171.68.255.255	11000000	11000000	11111111	11111111

16 host bits  
 $2^{16} - 2 = 65,536 - 2 = 65,534$  hosts

**Subnet Information**

171.68.99.71	10101011	01000100	01100011	01000111
255.255.240.0	11111111	11111111	11110000	00000000
<b>Subnet Address</b>			▲	
171.68.96.0	11000000	11000000	01100000	00000000
<b>First Host of this subnet</b>			⋮	
171.68.96.1	11000000	11000000	01100000	00000001
<b>Last Host of this subnet</b>			⋮	
171.68.111.254	11000000	11000000	01101111	11111110
<b>Broadcast of this subnet</b>			⋮	
171.68.111.255	11000000	11000000	01101111	11111111

Subnets: 4 subnet bits,  $2^4 - 1 = 16 - 1 = 15$  subnets  
 Hosts: 12 host bits,  $2^{12} - 2 = 4,096 - 2 = 4,094$  hosts per subnet

**Subnetting Asssingment 1 - Solutions**  
 CIS 81 (100 points)

**Problem 5**

<b>Host IP Address</b>	217.200.3.219
<b>Major Network Mask</b>	255.255.255.0
Major (Base) Network Address	217.200.3.0
Major Network Broadcast Address	217.200.3.255
Total Number of Host Bits	8 bits
Number of Hosts	254 hosts
<b>Subnet Mask</b>	255.255.255.224
Number of Subnet Bits	3 bits
Number of Usable Subnets (zero subnet used)	7 subnets
Number of Host Bits per Subnet	5 bits
Number of Usable Hosts per Subnet	30 hosts per subnet
Subnet Address for this IP Address	217.200.3.192
IP Address of First Host on this Subnet	217.200.3.193
IP Address of Last Host on this Subnet	217.200.3.222
Broadcast Address for this Subnet	217.200.3.223

**Major Network Information**

217.200.3.219	11011001	11001000	00000011	11011011
255.255.255.0	11111111	11111111	11111111	00000000
<b>Network Address</b>				
217.200.3.0	11011001	11001000	00000011	00000000
<b>Network Broadcast Address</b>				
217.200.3.255	11011001	11001000	00000011	11111111

8 host bits  
 $2^8 - 2 = 256 - 2 = 254$  hosts

**Subnet Information**

217.200.3.219	11011001	11001000	00000011	11011011
255.255.255.224	11111111	11111111	11111111	11100000
<b>Subnet Address</b>				
217.200.3.192	11011001	11001000	00000011	11000000
<b>First Host of this subnet</b>				
217.200.3.193	11011001	11001000	00000011	11000001
<b>Last Host of this subnet</b>				
217.200.3.222	11011001	11001000	00000011	11011110
<b>Broadcast of this subnet</b>				
217.200.3.223	11011001	11001000	00000011	11011111

Subnets: 3 subnet bits,  $2^3 - 1 = 8 - 1 = 7$  subnets  
 Hosts: 5 host bits,  $2^5 - 2 = 32 - 2 = 30$  hosts per subnet

**Subnetting Asssingment 1 - Solutions**  
 CIS 81 (100 points)

**Problem 1**

<b>Host IP Address</b>	172.30.1.33
<b>Major Network Mask</b>	255.255.0.0
Major (Base) Network Address	172.30.0.0
Major Network Broadcast Address	172.30.255.255
Total Number of Host Bits	16 bits
Number of Hosts	65,534 hosts
<b>Subnet Mask</b>	255.255.255.0
Number of Subnet Bits	8 bits
Number of Usable Subnets (zero subnet used)	255 subnets
Number of Host Bits per Subnet	8 bits
Number of Usable Hosts per Subnet	254 hosts per subnet
Subnet Address for this IP Address	172.30.1.0
IP Address of First Host on this Subnet	172.30.1.0
IP Address of Last Host on this Subnet	172.30.1.254
Broadcast Address for this Subnet	172.30.1.255

**Problem 2**

<b>Host IP Address</b>	172.30.1.33
<b>Major Network Mask</b>	255.255.255.0
Major (Base) Network Address	172.30.1.0
Major Network Broadcast Address	172.30.1.255
Total Number of Host Bits	254 hosts
Number of Hosts	
<b>Subnet Mask</b>	255.255.255.252
Number of Subnet Bits	6 bits
Number of Usable Subnets (zero subnet used)	63 subnets
Number of Host Bits per Subnet	2 bits
Number of Usable Hosts per Subnet	2 hosts per subnet
Subnet Address for this IP Address	172.30.1.32
IP Address of First Host on this Subnet	172.30.1.33
IP Address of Last Host on this Subnet	172.30.1.34
Broadcast Address for this Subnet	172.30.1.35

**Subnetting Asssingment 1 - Solutions**  
 CIS 81 (100 points)

**Problem 3**

<b>Host IP Address</b>	192.192.10.234
<b>Major Network Mask</b>	255.255.255.0
Major (Base) Network Address	192.192.10.0
Major Network Broadcast Address	192.192.10.255
Total Number of Host Bits	8 bits
Number of Hosts	254 hosts
<b>Subnet Mask</b>	255.255.255.248
Number of Subnet Bits	5 bits
Number of Usable Subnets (zero subnet used)	31 subnets
Number of Host Bits per Subnet	3 bits
Number of Usable Hosts per Subnet	6 hosts per subnet
Subnet Address for this IP Address	192.192.10.232
IP Address of First Host on this Subnet	192.192.10.233
IP Address of Last Host on this Subnet	192.192.10.238
Broadcast Address for this Subnet	192.192.10.239

**Problem 4**

<b>Host IP Address</b>	171.68.99.71
<b>Major Network Mask</b>	255.255.0.0
Major (Base) Network Address	171.68.0.0
Major Network Broadcast Address	171.68.255.255
Total Number of Host Bits	16 host bits
Number of Hosts	65,534 hosts
<b>Subnet Mask</b>	255.255.240.0
Number of Subnet Bits	4 bits
Number of Usable Subnets (zero subnet used)	15 subnets
Number of Host Bits per Subnet	12 bits
Number of Usable Hosts per Subnet	4,094 hosts per subnet
Subnet Address for this IP Address	171.68.96.0
IP Address of First Host on this Subnet	171.68.96.1
IP Address of Last Host on this Subnet	171.68.111.254
Broadcast Address for this Subnet	171.68.111.255

**Subnetting Asssingment 1 - Solutions**  
CIS 81 (100 points)

**Problem 5**

<b>Host IP Address</b>	217.200.3.219
<b>Major Network Mask</b>	255.255.255.0
Major (Base) Network Address	217.200.3.0
Major Network Broadcast Address	217.200.3.255
Total Number of Host Bits	8 bits
Number of Hosts	254 hosts
<b>Subnet Mask</b>	255.255.255.224
Number of Subnet Bits	3 bits
Number of Usable Subnets (zero subnet used)	7 subnets
Number of Host Bits per Subnet	5 bits
Number of Usable Hosts per Subnet	30 hosts per subnet
Subnet Address for this IP Address	217.200.3.192
IP Address of First Host on this Subnet	217.200.3.193
IP Address of Last Host on this Subnet	217.200.3.222
Broadcast Address for this Subnet	217.200.3.223