

IP Addressing and Subnetting

Workbook
Version 1.5

11111110

10010101

00011011

10000110

11010011

Student Name:

IP Address Classes

Class A	1 – 127	(Network 127 is reserved for loopback and internal testing)	
	Leading bit pattern	0	00000000.00000000.00000000.00000000 Network . Host . Host . Host
Class B	128 – 191	Leading bit pattern	10
			10000000.00000000.00000000.00000000 Network . Network . Host . Host
Class C	192 – 223	Leading bit pattern	110
			11000000.00000000.00000000.00000000 Network . Network . Network . Host
Class D	224 – 239	(Reserved for multicast)	
Class E	240 – 255	(Reserved for experimental, used for research)	

Private Address Space

Class A	10.0.0.0 to 10.255.255.255
Class B	172.16.0.0 to 172.31.255.255
Class C	192.168.0.0 to 192.168.255.255

Default Subnet Masks

Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

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Workbooks included in the series:

IP Addressing and Subnetting Workbooks
ACLs - Access Lists Workbooks
VLSM Variable-Length Subnet Mask IWorkbooks

Binary To Decimal Conversion

128	64	32	16	8	4	2	1	Answers	Scratch Area	
1	0	0	1	0	0	1	0	<u>146</u>	<i>128</i>	<i>64</i>
0	1	1	1	0	1	1	1	<u>119</u>	<i>16</i>	<i>32</i>
1	1	1	1	1	1	1	1		<i>2</i>	<i>16</i>
1	1	0	0	0	1	0	1		<i>146</i>	<i>4</i>
1	1	1	1	0	1	1	0			<i>2</i>
1	1	1	1	0	1	1	0			<i>1</i>
0	0	0	1	0	0	1	1			<u>119</u>
1	1	1	1	0	1	1	0			
0	0	0	1	0	0	1	1			
1	0	0	0	0	0	0	1			
0	0	1	1	0	0	0	1			
0	1	1	1	1	0	0	0			
1	1	1	1	0	0	0	0			
0	0	1	1	1	0	1	1			
0	0	0	0	0	1	1	1			
								00011011		
								10101010		
								01101111		
								11111000		
								00100000		
								01010101		
								00111110		
								00000011		
								11101101		
								11000000		

Decimal To Binary Conversion

Use all 8 bits for each problem

128	64	32	16	8	4	2	1	=	255	Scratch Area	
1	1	1	0	1	1	1	0		238	238	34
										-128	-32
0	0	1	0	0	0	1	0		34	110	2
										-64	-2
									123	46	0
										-32	
									50	14	
										-8	
									255	6	
										-4	
									200	2	
										-2	
									10	0	
									138		
									1		
									13		
									250		
									107		
									224		
									114		
									192		
									172		
									100		
									119		
									57		
									98		
									179		
									2		

Address Class Identification

Address	Class
10.250.1.1	<u> <i>A</i> </u>
150.10.15.0	<u> <i>B</i> </u>
192.14.2.0	<u> </u>
148.17.9.1	<u> </u>
193.42.1.1	<u> </u>
126.8.156.0	<u> </u>
220.200.23.1	<u> </u>
230.230.45.58	<u> </u>
177.100.18.4	<u> </u>
119.18.45.0	<u> </u>
249.240.80.78	<u> </u>
199.155.77.56	<u> </u>
117.89.56.45	<u> </u>
215.45.45.0	<u> </u>
199.200.15.0	<u> </u>
95.0.21.90	<u> </u>
33.0.0.0	<u> </u>
158.98.80.0	<u> </u>
219.21.56.0	<u> </u>

Network & Host Identification

Circle the network portion
of these addresses:

177.100.18.4

119.18.45.0

209.240.80.78

199.155.77.56

117.89.56.45

215.45.45.0

192.200.15.0

95.0.21.90

33.0.0.0

158.98.80.0

217.21.56.0

10.250.1.1

150.10.15.0

192.14.2.0

148.17.9.1

193.42.1.1

126.8.156.0

220.200.23.1

Circle the host portion of
these addresses:

10.15.123.50

171.2.199.31

198.125.87.177

223.250.200.222

17.45.222.45

126.201.54.231

191.41.35.112

155.25.169.227

192.15.155.2

123.102.45.254

148.17.9.155

100.25.1.1

195.0.21.98

25.250.135.46

171.102.77.77

55.250.5.5

218.155.230.14

10.250.1.1

Network Addresses

Using the IP address and subnet mask shown write out the network address:

188.10.18.2 *188 . 10 . 0 . 0*
255.255.0.0 _____

10.10.48.80 *10 . 10 . 48 . 0*
255.255.255.0 _____

192.149.24.191
255.255.255.0 _____

150.203.23.19
255.255.0.0 _____

10.10.10.10
255.0.0.0 _____

186.13.23.110
255.255.255.0 _____

223.69.230.250
255.255.0.0 _____

200.120.135.15
255.255.255.0 _____

27.125.200.151
255.0.0.0 _____

199.20.150.35
255.255.255.0 _____

191.55.165.135
255.255.255.0 _____

28.212.250.254
255.255.0.0 _____

Host Addresses

Using the IP address and subnet mask shown write out the host address:

188.10.18.2 *0 . 0 . 18 . 2*
255.255.0.0 _____

10.10.48.80 *0 . 0 . 0 . 80*
255.255.255.0 _____

222.49.49.11
255.255.255.0 _____

128.23.230.19
255.255.0.0 _____

10.10.10.10
255.0.0.0 _____

200.113.123.11
255.255.255.0 _____

223.169.23.20
255.255.0.0 _____

203.20.35.215
255.255.255.0 _____

117.15.2.51
255.0.0.0 _____

199.120.15.135
255.255.255.0 _____

191.55.165.135
255.255.255.0 _____

48.21.25.54
255.255.0.0 _____

Default Subnet Masks

Write the correct default subnet mask for each of the following addresses:

177.100.18.4	<i>255 . 255 . 0 . 0</i> _____
119.18.45.0	<i>255 . 0 . 0 . 0</i> _____
191.249.234.191	_____
223.23.223.109	_____
10.10.250.1	_____
126.123.23.1	_____
223.69.230.250	_____
192.12.35.105	_____
77.251.200.51	_____
189.210.50.1	_____
88.45.65.35	_____
128.212.250.254	_____
193.100.77.83	_____
125.125.250.1	_____
1.1.10.50	_____
220.90.130.45	_____
134.125.34.9	_____
95.250.91.99	_____

Custom Subnet Masks

Problem 4

Number of needed subnets **6**

Number of needed usable hosts **30**

Network Address **210.100.56.0**

Address class _____

Default subnet mask _____

Custom subnet mask _____

Total number of subnets _____

Total number of host addresses _____

Number of usable addresses _____

Number of bits borrowed _____

Show your work for Problem 4 in the space below.

		Number of Subnets					Number of Hosts						
		256	128	64	32	16	8	4	2	-			
	-	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			