Subnetting Cheat Sheet

IPv4 subnet masks, host counts, VLSM and the magic-number method on one page

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Reference for CCNA 200-301 · verified June 2026

SUBNET MASKS (/24 TO /30)

`/24`	255.255.255.0 · 254 hosts · block 256
`/25`	255.255.255.128 · 126 hosts · block 128
`/26`	255.255.255.192 · 62 hosts · block 64
`/27`	255.255.255.224 · 30 hosts · block 32
`/28`	255.255.255.240 · 14 hosts · block 16
`/29`	255.255.255.248 · 6 hosts · block 8
`/30`	255.255.255.252 · 2 hosts · block 4
`/31`	255.255.255.254 · point-to-point (RFC 3021)
`/32`	255.255.255.255 · single host route

LARGER PREFIXES (/8 TO /23)

`/8`	255.0.0.0 · 16,777,214 hosts
`/16`	255.255.0.0 · 65,534 hosts
`/19`	255.255.224.0 · 8,190 hosts
`/20`	255.255.240.0 · 4,094 hosts
`/21`	255.255.248.0 · 2,046 hosts
`/22`	255.255.252.0 · 1,022 hosts
`/23`	255.255.254.0 · 510 hosts

HOSTS NEEDED TO MASK

`2 hosts`	/30 (2 usable)
`up to 6`	/29 (6 usable)
`up to 14`	/28 (14 usable)
`up to 30`	/27 (30 usable)
`up to 62`	/26 (62 usable)
`up to 126`	/25 (126 usable)
`up to 254`	/24 (254 usable)
`up to 510`	/23 (510 usable)
`up to 1022`	/22 (1022 usable)

MAGIC NUMBER (MASK BYTE TO BLOCK)

`128`	block 128 (1 borrowed bit)
`192`	block 64 (2 bits)
`224`	block 32 (3 bits)
`240`	block 16 (4 bits)
`248`	block 8 (5 bits)
`252`	block 4 (6 bits)
`254`	block 2 (7 bits)
`block = 256 - mask byte`	subnets fall on multiples of it

POWERS OF 2

`2^1 / 2^2 / 2^3`	2 / 4 / 8
`2^4 / 2^5`	16 / 32
`2^6 / 2^7`	64 / 128
`2^8 / 2^9`	256 / 512
`2^10`	1024
`2^12`	4096
`2^16`	65,536

WILDCARD (INVERSE) MASKS

`/24`	0.0.0.255
`/25`	0.0.0.127
`/26`	0.0.0.63
`/27`	0.0.0.31
`/28`	0.0.0.15
`/29`	0.0.0.7
`/30`	0.0.0.3
`/16`	0.0.255.255

FIND THE ADDRESSES

`Network ID`	IP AND mask (host bits = 0)
`Broadcast`	network + block - 1 (host bits = 1)
`First host`	network + 1
`Last host`	broadcast - 1
`Usable hosts`	2^H - 2 (H = host bits)

VLSM RULES

`Pick the mask`	2^H - 2 must be >= hosts needed
`Order`	allocate the largest subnet first
`Next subnet`	previous broadcast + 1
`Overlap check`	next subnet ID > previous broadcast
`Protocols`	RIPv2, OSPFv2, EIGRP yes; RIPv1 no
`Verify in IOS`	'variably subnetted' in show ip route

CLASSES AND PRIVATE RANGES

`Class A`	1-126 · default /8
`Class B`	128-191 · default /16
`Class C`	192-223 · default /24
`Private A`	10.0.0.0/8
`Private B`	172.16.0.0/12
`Private C`	192.168.0.0/16
`Loopback`	127.0.0.0/8
`Link-local`	169.254.0.0/16

Full guide with tested examples: **computingforgeeks.com/subnetting-cheat-sheet/**