IPv4 subnetting cheat sheet

Keep this next to you while practising. Check your answers with the free subnet calculator on fmtechub.com.

Prefix table

CIDR	Subnet mask	Wildcard	Addresses	Usable hosts	Block size
/8	255.0.0.0	0.255.255.255	16,777,216	16,777,214	1 in octet 1
/9	255.128.0.0	0.127.255.255	8,388,608	8,388,606	128 in octet 2
/10	255.192.0.0	0.63.255.255	4,194,304	4,194,302	64 in octet 2
/11	255.224.0.0	0.31.255.255	2,097,152	2,097,150	32 in octet 2
/12	255.240.0.0	0.15.255.255	1,048,576	1,048,574	16 in octet 2
/13	255.248.0.0	0.7.255.255	524,288	524,286	8 in octet 2
/14	255.252.0.0	0.3.255.255	262,144	262,142	4 in octet 2
/15	255.254.0.0	0.1.255.255	131,072	131,070	2 in octet 2
/16	255.255.0.0	0.0.255.255	65,536	65,534	1 in octet 2
/17	255.255.128.0	0.0.127.255	32,768	32,766	128 in octet 3
/18	255.255.192.0	0.0.63.255	16,384	16,382	64 in octet 3
/19	255.255.224.0	0.0.31.255	8,192	8,190	32 in octet 3
/20	255.255.240.0	0.0.15.255	4,096	4,094	16 in octet 3
/21	255.255.248.0	0.0.7.255	2,048	2,046	8 in octet 3
/22	255.255.252.0	0.0.3.255	1,024	1,022	4 in octet 3
/23	255.255.254.0	0.0.1.255	512	510	2 in octet 3
/24	255.255.255.0	0.0.0.255	256	254	1 in octet 3
/25	255.255.255.128	0.0.0.127	128	126	128 in octet 4
/26	255.255.255.192	0.0.0.63	64	62	64 in octet 4
/27	255.255.255.224	0.0.0.31	32	30	32 in octet 4
/28	255.255.255.240	0.0.0.15	16	14	16 in octet 4
/29	255.255.255.248	0.0.0.7	8	6	8 in octet 4
/30	255.255.255.252	0.0.0.3	4	2	4 in octet 4
/31	255.255.255.254	0.0.0.1	2	2 (point-to-point, RFC 3021)	2 in octet 4
/32	255.255.255.255	0.0.0.0	1	1 (host route)	1 in octet 4

> Usable hosts = addresses − 2 (network and broadcast). /31 and /32 are special cases.

Fast method in 4 steps

1. Find the **interesting octet**: the one where the mask is not 255 or 0.
2. **Block size** = 256 − mask value in that octet (e.g. 256 − 224 = 32).
3. **Network** = the multiple of the block size at or below the IP in that octet.
4. **Broadcast** = next network − 1. Usable hosts sit between them.

> **Example:** 192.168.10.77/27 → mask 255.255.255.224, block 32 → network .64, broadcast .95, hosts .65–.94.

Private and special ranges

Range	Use
10.0.0.0/8	Private (RFC 1918)
172.16.0.0/12	Private: 172.16.0.0 – 172.31.255.255
192.168.0.0/16	Private, common at home
100.64.0.0/10	Carrier-grade NAT (RFC 6598)
127.0.0.0/8	Loopback (this device)
169.254.0.0/16	Link-local / APIPA: no DHCP answer
224.0.0.0/4	Multicast
0.0.0.0/0	Default route (“everything”)

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Powers of two

Bits	1	2	3	4	5	6	7	8
2^n	2	4	8	16	32	64	128	256

> Need N hosts? Pick the smallest n where $2^n - 2 \geq N$; prefix = 32 − n. Need S subnets? Borrow b bits where $2^b \geq S$.

Mask octet values

Bits on	1	2	3	4	5	6	7	8
Value	128	192	224	240	248	252	254	255

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