To draw the cheat sheet:

* start with 1 and double until you reach 128 (right to left)
* subtract each unit of top row from 256
* from right to left do /32, /31, /30 etc

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 | Represents group size |
| 128 | 192 | 224 | 240 | 248 | 252 | 254 | 255 | Represents subnet mask |
| /25 | /26 | /27 | /28 | /29 | /30 | /31 | /32 | Represents CIDR |

We need to solve for these 7:

A close up of a text

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Our first example problem will be 10.1.1.55 /28

To convert this CIDR to a subnet mask, we look at the CIDR, since its /28 we look at the chart and see that the subnet mask above it is 240. So, the subnet mask would be 255.255.255.240.

Now we look at the group size, since the CIDR was /28, we check the group size that is allocated to it which in this case is 16. We then look at the last octet of the IP address which is .55 and we start from 0 and count up in the group size which, in this case, is 16. We do this until we breach the last octet of the IP address:

A green and red numbers and numbers

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The green line splitting the 2 numbers is where the target IP address is. The number which breaches it (.64) would be the next network so the next network would be 10.0.0.64. The network ID is before the target IP (the number before the breach number) so 10.0.0.48. the IP address before the next network (10.0.0.64) is our broadcast network so we do the next network -1 (for last octet) so the broadcast network is 10.0.0.63. To find the first host IP, add one to the network ID (10.0.0.48) so the first host IP would be 10.0.0.49. To find the last host IP, subtract one from the broadcast IP (10.0.0.63) so the last host IP would be 10.0.0.62. To solve for the number of IP addresses, its literally the same as the group size which is, in this case, 16. But keep in mind that this is the total number of addresses (including network ID and broadcast IP which are not usable addresses), to solve for the number of usable addresses, just do the group size which is, in this case 16, -2, so in this case the number of usable addresses is 14.

10.1.1.55 /28:

Network ID: 10.1.1.48

Broadcast IP: 10.1.1.63

First Host IP: 10.1.1.49

Last Host IP: 10.1.1.62

Next Network: 10.1.1.64

Number of IP addresses: 16 (14 usable)

CIDR/Subnet: /28 ---> 255.255.255.240

Now let’s solve for the 7 for the IP address: 10.1.1.37 /29.

A screenshot of a math test

AI-generated content may be incorrect.10.1.1.37 /29:

Network ID: 10.1.1.32

Broadcast IP: 10.1.1.39

First Host IP: 10.1.1.33

Last Host IP: 10.1.1.38

Next Network: 10.1.1.40

Number of IP addresses: 8 (6 usable)

CIDR/Subnet: /29 ---> 255.255.255.248

A screenshot of a math test

AI-generated content may be incorrect.Let’s solve for 10.2.2.88 /27:

10.2.2.88 /27:

Network ID: 10.2.2.64

Broadcast IP: 10.2.2.95

First Host IP: 10.2.2.65

Last Host IP: 10.2.2.94

Next Network: 10.2.2.96

Number of IP addresses: 32 (30 usable)

CIDR/Subnet: /27 ---> 255.255.255.224

A green and red numbers

AI-generated content may be incorrect.Let’s solve for 10.2.2.111 /25:

10.2.2.111 /25:

Network ID: 10.2.2.0

Broadcast IP: 10.2.2.127

First Host IP: 10.2.2.1

Last Host IP: 10.2.2.126

Next Network: 10.2.2.128

Number of IP addresses: 128 (126 usable)

CIDR/Subnet: /25 ---> 255.255.255.128

NEXT PAGE

A screenshot of a math test

AI-generated content may be incorrect.Let’s solve for 10.2.2.20 /30:

10.2.2.20 /30:

Network ID: 10.2.2.20

Broadcast IP: 10.2.2.23

First Host IP: 10.2.2.21

Last Host IP: 10.2.2.22

Next Network: 10.2.2.24

Number of IP addresses: 4 (2 usable)

CIDR/Subnet: /30 ---> 255.255.255.252

As we incremented each time by 4, we hit our target IP (20), but we must go one more to pass it which we did. So, when we landed on .20, this tells us that 10.2.2.20 is our network ID. Then we just solve the rest as normal

Let’s solve for 10.2.2.199 /26:

The subnet mask is the number above /26 so its .192. So, the subnet mask is 255.255.255.192. The number of IP addresses is the group size allocated to the CIDR so in this case the number of IP addresses is 64 and 62 are usable. Then we count in 64’s from 0. We get to .192 so we have to increment again but the next increment is .256 and that is not a valid IP address:

A screenshot of a math test

AI-generated content may be incorrect.

So, what we do is we increment the THIRD octet by 1. In this case the third octet is .2. So, it turns into .3:

A screenshot of a math game

AI-generated content may be incorrect.A screenshot of a math test

AI-generated content may be incorrect.



And the .256 can be replaced with .0. if we needed to continue it would look like this:

A screenshot of a math game

AI-generated content may be incorrect.

If we needed to keep incrementing, the next increment would be 10.2.3.64. But in this case we don’t need to because we have passed our target IP. So this is correct here:

A screenshot of a number

AI-generated content may be incorrect.

Now we can solve as normal:

10.2.2.199 /26:

Network ID: 10.2.2.192

Broadcast IP: 10.2.2.255

First Host IP: 10.2.2.193

Last Host IP: 10.2.2.254

Next Network: 10.2.3.0

Number of IP addresses: 64 (62 usable)

CIDR/Subnet: /26 ---> 255.255.255.192