Set 2 — Answer key

Mark your paper first, then read the working for anything you missed. Every answer was generated from subnet maths and checked independently.

1. On a /30, what is 10.135.238.200?

   Answer: The network address

   - /30 = 255.255.255.252: interesting octet is the 4th (252). Block = 256 − 252 = 4.
   - 200 ÷ 4 = 50 r0 → block starts at 200, next block at 204.
   - Network 10.135.238.200, broadcast 10.135.238.203.
   - 10.135.238.200 is the network address.

   `Check it: https://subnetcalculator.dev/?ip=10.135.238.200&cidr=30`

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2. Which network is 10.36.126.182/28 in?

   Answer: 10.36.126.176/28

   - /28 = 255.255.255.240: interesting octet is the 4th (240). Block = 256 − 240 = 16.
   - 182 ÷ 16 = 11 r6 → block starts at 176, next block at 192.
   - Network 10.36.126.176, broadcast 10.36.126.191.

   `Check it: https://subnetcalculator.dev/?ip=10.36.126.182&cidr=28`

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3. Which network is 172.31.151.206/29 in?

   Answer: 172.31.151.200/29

   - /29 = 255.255.255.248: interesting octet is the 4th (248). Block = 256 − 248 = 8.
   - 206 ÷ 8 = 25 r6 → block starts at 200, next block at 208.
   - Network 172.31.151.200, broadcast 172.31.151.207.

   `Check it: https://subnetcalculator.dev/?ip=172.31.151.206&cidr=29`

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4. Last usable host in the subnet of 172.19.76.69/30?

   Answer: 172.19.76.70

   - /30 = 255.255.255.252: interesting octet is the 4th (252). Block = 256 − 252 = 4.
   - 69 ÷ 4 = 17 r1 → block starts at 68, next block at 72.
   - Network 172.19.76.68, broadcast 172.19.76.71.
   - Last usable = broadcast − 1 = 172.19.76.70 (not 172.19.76.71).

   `Check it: https://subnetcalculator.dev/?ip=172.19.76.69&cidr=30`

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5. 10.83.71.156/27: find the network, broadcast and usable range.

   Answer: Network 10.83.71.128 · broadcast 10.83.71.159 · usable 10.83.71.129–10.83.71.158

   - /27 = 255.255.255.224: interesting octet is the 4th (224). Block = 256 − 224 = 32.
   - 156 ÷ 32 = 4 r28 → block starts at 128, next block at 160.
   - Network 10.83.71.128, broadcast 10.83.71.159.
   - Usable 10.83.71.129–10.83.71.158 (30 hosts).

   `Check it: https://subnetcalculator.dev/?ip=10.83.71.156&cidr=27`

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6. 192.168.66.105/29: find the network, broadcast and usable range.

   Answer: Network 192.168.66.104 · broadcast 192.168.66.111 · usable 192.168.66.105–192.168.66.110

   - /29 = 255.255.255.248: interesting octet is the 4th (248). Block = 256 − 248 = 8.
   - 105 ÷ 8 = 13 r1 → block starts at 104, next block at 112.
   - Network 192.168.66.104, broadcast 192.168.66.111.
   - Usable 192.168.66.105–192.168.66.110 (6 hosts).

   `Check it: https://subnetcalculator.dev/?ip=192.168.66.105&cidr=29`

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7. On a /28, what is 198.51.100.111?

   Answer: The broadcast address

   - /28 = 255.255.255.240: interesting octet is the 4th (240). Block = 256 − 240 = 16.
   - 111 ÷ 16 = 6 r15 → block starts at 96, next block at 112.
   - Network 198.51.100.96, broadcast 198.51.100.111.
   - 198.51.100.111 is the broadcast address.

   `Check it: https://subnetcalculator.dev/?ip=198.51.100.111&cidr=28`

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8. 192.0.2.108/25: find the network, broadcast and usable range.

   Answer: Network 192.0.2.0 · broadcast 192.0.2.127 · usable 192.0.2.1–192.0.2.126

   - /25 = 255.255.255.128: interesting octet is the 4th (128). Block = 256 − 128 = 128.
   - 108 ÷ 128 = 0 r108 → block starts at 0, next block at 128.
   - Network 192.0.2.0, broadcast 192.0.2.127.
   - Usable 192.0.2.1–192.0.2.126 (126 hosts).

   `Check it: https://subnetcalculator.dev/?ip=192.0.2.108&cidr=25`

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9. Block size (magic number) for /30?

   Answer: 4 (in the 4th octet)

   - /30 = 255.255.255.252. Interesting octet: 4th (252).
   - 256 − 252 = 4.

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10. 172.28.84.37/25: find the network, broadcast and usable range.

    Answer: Network 172.28.84.0 · broadcast 172.28.84.127 · usable 172.28.84.1–172.28.84.126

    - /25 = 255.255.255.128: interesting octet is the 4th (128). Block = 256 − 128 = 128.
    - 37 ÷ 128 = 0 r37 → block starts at 0, next block at 128.
    - Network 172.28.84.0, broadcast 172.28.84.127.
    - Usable 172.28.84.1–172.28.84.126 (126 hosts).

    `Check it: https://subnetcalculator.dev/?ip=172.28.84.37&cidr=25`

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11. Smallest prefix that fits 2 hosts?

    Answer: /30 (255.255.255.252, 2 usable)

    - 2 hosts + 2 (network and broadcast) = 4 addresses.
    - Next power of two: 4 = 2 host bits → /30 (2 usable).

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12. Prefix length for mask 255.255.255.248?

    Answer: /29

    - 255.255.255.248: 3 × 255 = 24 bits, plus 248 = 5 bit(s) → /29.

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13. 10.136.221.164/26: find the network, broadcast and usable range.

    Answer: Network 10.136.221.128 · broadcast 10.136.221.191 · usable 10.136.221.129–10.136.221.190

    - /26 = 255.255.255.192: interesting octet is the 4th (192). Block = 256 − 192 = 64.
    - 164 ÷ 64 = 2 r36 → block starts at 128, next block at 192.
    - Network 10.136.221.128, broadcast 10.136.221.191.
    - Usable 10.136.221.129–10.136.221.190 (62 hosts).

    `Check it: https://subnetcalculator.dev/?ip=10.136.221.164&cidr=26`

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14. Broadcast address for 192.168.216.129/30?

    Answer: 192.168.216.131

    - /30 = 255.255.255.252: interesting octet is the 4th (252). Block = 256 − 252 = 4.
    - 129 ÷ 4 = 32 r1 → block starts at 128, next block at 132.
    - Network 192.168.216.128, broadcast 192.168.216.131.

    `Check it: https://subnetcalculator.dev/?ip=192.168.216.129&cidr=30`

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15. Which network is 192.0.2.63/27 in?

    Answer: 192.0.2.32/27

    - /27 = 255.255.255.224: interesting octet is the 4th (224). Block = 256 − 224 = 32.
    - 63 ÷ 32 = 1 r31 → block starts at 32, next block at 64.
    - Network 192.0.2.32, broadcast 192.0.2.63.
    - Trap: this host address is the broadcast of its block, so it still belongs to that block.

    `Check it: https://subnetcalculator.dev/?ip=192.0.2.63&cidr=27`

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16. Broadcast address for 172.30.99.42/30?

    Answer: 172.30.99.43

    - /30 = 255.255.255.252: interesting octet is the 4th (252). Block = 256 − 252 = 4.
    - 42 ÷ 4 = 10 r2 → block starts at 40, next block at 44.
    - Network 172.30.99.40, broadcast 172.30.99.43.

    `Check it: https://subnetcalculator.dev/?ip=172.30.99.42&cidr=30`

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17. Smallest prefix that fits 5 hosts?

    Answer: /29 (255.255.255.248, 6 usable)

    - 5 hosts + 2 (network and broadcast) = 7 addresses.
    - Next power of two: 8 = 3 host bits → /29 (6 usable).

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18. Last usable host in the subnet of 172.21.127.206/25?

    Answer: 172.21.127.254

    - /25 = 255.255.255.128: interesting octet is the 4th (128). Block = 256 − 128 = 128.
    - 206 ÷ 128 = 1 r78 → block starts at 128, next block at 256.
    - Network 172.21.127.128, broadcast 172.21.127.255.
    - Last usable = broadcast − 1 = 172.21.127.254 (not 172.21.127.255).

    `Check it: https://subnetcalculator.dev/?ip=172.21.127.206&cidr=25`

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19. Which network is 172.26.165.203/28 in?

    Answer: 172.26.165.192/28

    - /28 = 255.255.255.240: interesting octet is the 4th (240). Block = 256 − 240 = 16.
    - 203 ÷ 16 = 12 r11 → block starts at 192, next block at 208.
    - Network 172.26.165.192, broadcast 172.26.165.207.

    `Check it: https://subnetcalculator.dev/?ip=172.26.165.203&cidr=28`

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20. VLSM: 10.234.183.0/24 already has 10.234.183.0/25, 10.234.183.128/27. Next subnet for 2 hosts?

    Answer: 10.234.183.160/30

    - 2 hosts + 2 → /30 (block 4).
    - The used blocks end at 10.234.183.159, so the next free address is 10.234.183.160.
    - 10.234.183.160 is a multiple of 4 in its octet, so it is aligned: 10.234.183.160/30.

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