Set 1 — 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. 192.168.73.233/26: find the network, broadcast and usable range.

   Answer: Network 192.168.73.192 · broadcast 192.168.73.255 · usable 192.168.73.193–192.168.73.254

   - /26 = 255.255.255.192: interesting octet is the 4th (192). Block = 256 − 192 = 64.
   - 233 ÷ 64 = 3 r41 → block starts at 192, next block at 256.
   - Network 192.168.73.192, broadcast 192.168.73.255.
   - Usable 192.168.73.193–192.168.73.254 (62 hosts).

   `Check it: https://subnetcalculator.dev/?ip=192.168.73.233&cidr=26`

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2. Smallest prefix that fits 25 hosts?

   Answer: /27 (255.255.255.224, 30 usable)

   - 25 hosts + 2 (network and broadcast) = 27 addresses.
   - Next power of two: 32 = 5 host bits → /27 (30 usable).

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3. Smallest prefix that fits 30 hosts?

   Answer: /27 (255.255.255.224, 30 usable)

   - 30 hosts + 2 (network and broadcast) = 32 addresses.
   - Next power of two: 32 = 5 host bits → /27 (30 usable).

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4. 192.168.60.26/26: find the network, broadcast and usable range.

   Answer: Network 192.168.60.0 · broadcast 192.168.60.63 · usable 192.168.60.1–192.168.60.62

   - /26 = 255.255.255.192: interesting octet is the 4th (192). Block = 256 − 192 = 64.
   - 26 ÷ 64 = 0 r26 → block starts at 0, next block at 64.
   - Network 192.168.60.0, broadcast 192.168.60.63.
   - Usable 192.168.60.1–192.168.60.62 (62 hosts).

   `Check it: https://subnetcalculator.dev/?ip=192.168.60.26&cidr=26`

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5. 203.0.113.103/27: find the network, broadcast and usable range.

   Answer: Network 203.0.113.96 · broadcast 203.0.113.127 · usable 203.0.113.97–203.0.113.126

   - /27 = 255.255.255.224: interesting octet is the 4th (224). Block = 256 − 224 = 32.
   - 103 ÷ 32 = 3 r7 → block starts at 96, next block at 128.
   - Network 203.0.113.96, broadcast 203.0.113.127.
   - Usable 203.0.113.97–203.0.113.126 (30 hosts).

   `Check it: https://subnetcalculator.dev/?ip=203.0.113.103&cidr=27`

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6. How many usable hosts in a /27?

   Answer: 30

   - 5 host bits: 2^5 = 32 addresses − 2 = 30.

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7. 192.0.2.204/27: find the network, broadcast and usable range.

   Answer: Network 192.0.2.192 · broadcast 192.0.2.223 · usable 192.0.2.193–192.0.2.222

   - /27 = 255.255.255.224: interesting octet is the 4th (224). Block = 256 − 224 = 32.
   - 204 ÷ 32 = 6 r12 → block starts at 192, next block at 224.
   - Network 192.0.2.192, broadcast 192.0.2.223.
   - Usable 192.0.2.193–192.0.2.222 (30 hosts).

   `Check it: https://subnetcalculator.dev/?ip=192.0.2.204&cidr=27`

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8. Block size (magic number) for /25?

   Answer: 128 (in the 4th octet)
   - /25 = 255.255.255.128. Interesting octet: 4th (128).
   - 256 − 128 = 128.

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9. 192.168.31.241/27: find the network, broadcast and usable range.

   Answer: Network 192.168.31.224 · broadcast 192.168.31.255 · usable 192.168.31.225–192.168.31.254
   - /27 = 255.255.255.224: interesting octet is the 4th (224). Block = 256 − 224 = 32.
   - 241 ÷ 32 = 7 r17 → block starts at 224, next block at 256.
   - Network 192.168.31.224, broadcast 192.168.31.255.
   - Usable 192.168.31.225–192.168.31.254 (30 hosts).

   `Check it: https://subnetcalculator.dev/?ip=192.168.31.241&cidr=27`

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10. Subnet mask for /25?

    Answer: 255.255.255.128
    - /25 = 25 one-bits: 3 full octet(s) of 255, then 1 bit(s) = 128 in the 4th octet.

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11. Which network is 203.0.113.230/27 in?

    Answer: 203.0.113.224/27
    - /27 = 255.255.255.224: interesting octet is the 4th (224). Block = 256 − 224 = 32.
    - 230 ÷ 32 = 7 r6 → block starts at 224, next block at 256.
    - Network 203.0.113.224, broadcast 203.0.113.255.

    `Check it: https://subnetcalculator.dev/?ip=203.0.113.230&cidr=27`

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12. Which network is 172.18.217.66/26 in?

    Answer: 172.18.217.64/26
    - /26 = 255.255.255.192: interesting octet is the 4th (192). Block = 256 − 192 = 64.
    - 66 ÷ 64 = 1 r2 → block starts at 64, next block at 128.
    - Network 172.18.217.64, broadcast 172.18.217.127.

    `Check it: https://subnetcalculator.dev/?ip=172.18.217.66&cidr=26`

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13. Prefix length for mask 255.255.255.128?

    Answer: /25
    - 255.255.255.128: 3 × 255 = 24 bits, plus 128 = 1 bit(s) → /25.

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14. Which network is 172.29.154.186/27 in?

    Answer: 172.29.154.160/27
    - /27 = 255.255.255.224: interesting octet is the 4th (224). Block = 256 − 224 = 32.
    - 186 ÷ 32 = 5 r26 → block starts at 160, next block at 192.
    - Network 172.29.154.160, broadcast 172.29.154.191.

    `Check it: https://subnetcalculator.dev/?ip=172.29.154.186&cidr=27`

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15. 172.28.164.247/26: find the network, broadcast and usable range.

    Answer: Network 172.28.164.192 · broadcast 172.28.164.255 · usable 172.28.164.193–172.28.164.254
    - /26 = 255.255.255.192: interesting octet is the 4th (192). Block = 256 − 192 = 64.
    - 247 ÷ 64 = 3 r55 → block starts at 192, next block at 256.
    - Network 172.28.164.192, broadcast 172.28.164.255.
    - Usable 172.28.164.193–172.28.164.254 (62 hosts).

    `Check it: https://subnetcalculator.dev/?ip=172.28.164.247&cidr=26`

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16. Smallest prefix that fits 60 hosts?

    Answer: /26 (255.255.255.192, 62 usable)

    - 60 hosts + 2 (network and broadcast) = 62 addresses.
    - Next power of two: 64 = 6 host bits → /26 (62 usable).

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17. Which network is 203.0.113.182/25 in?

    Answer: 203.0.113.128/25

    - /25 = 255.255.255.128: interesting octet is the 4th (128). Block = 256 − 128 = 128.
    - 182 ÷ 128 = 1 r54 → block starts at 128, next block at 256.
    - Network 203.0.113.128, broadcast 203.0.113.255.

    `Check it: https://subnetcalculator.dev/?ip=203.0.113.182&cidr=25`

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18. Which network is 192.168.231.144/26 in?

    Answer: 192.168.231.128/26

    - /26 = 255.255.255.192: interesting octet is the 4th (192). Block = 256 − 192 = 64.
    - 144 ÷ 64 = 2 r16 → block starts at 128, next block at 192.
    - Network 192.168.231.128, broadcast 192.168.231.191.

    `Check it: https://subnetcalculator.dev/?ip=192.168.231.144&cidr=26`

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19. VLSM: split 172.28.56.0/24 for 2, 54 hosts, largest first. Which subnet does the 2-host LAN get?

    Answer: 172.28.56.64/30

    - Largest first: 54, 2.
    - 54 → /26 (block 64); 2 → /30 (block 4).
    - Place each on the next free aligned address in 172.28.56.0/24: 172.28.56.0/26, 172.28.56.64/30.

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20. VLSM: split 10.3.104.0/24 for 123, 2, 3 hosts, largest first. Which subnet does the 2-host LAN get?

    Answer: 10.3.104.136/30

    - Largest first: 123, 3, 2.
    - 123 → /25 (block 128); 3 → /29 (block 8); 2 → /30 (block 4).
    - Place each on the next free aligned address in 10.3.104.0/24: 10.3.104.0/25, 10.3.104.128/29, 10.3.104.136/30.

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