IP Subnetting Exercise

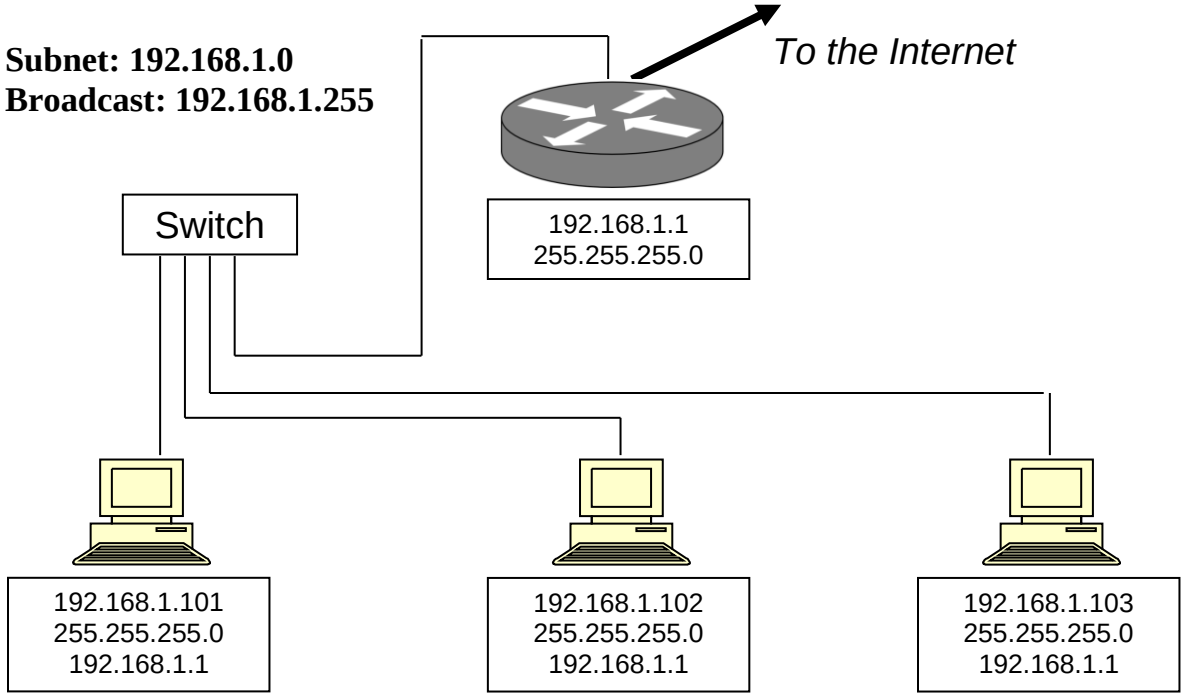
In the diagrams here, there are three numbers given for each NIC, in this order:

- IP Address
- Subnet Mask
- Default Gateway

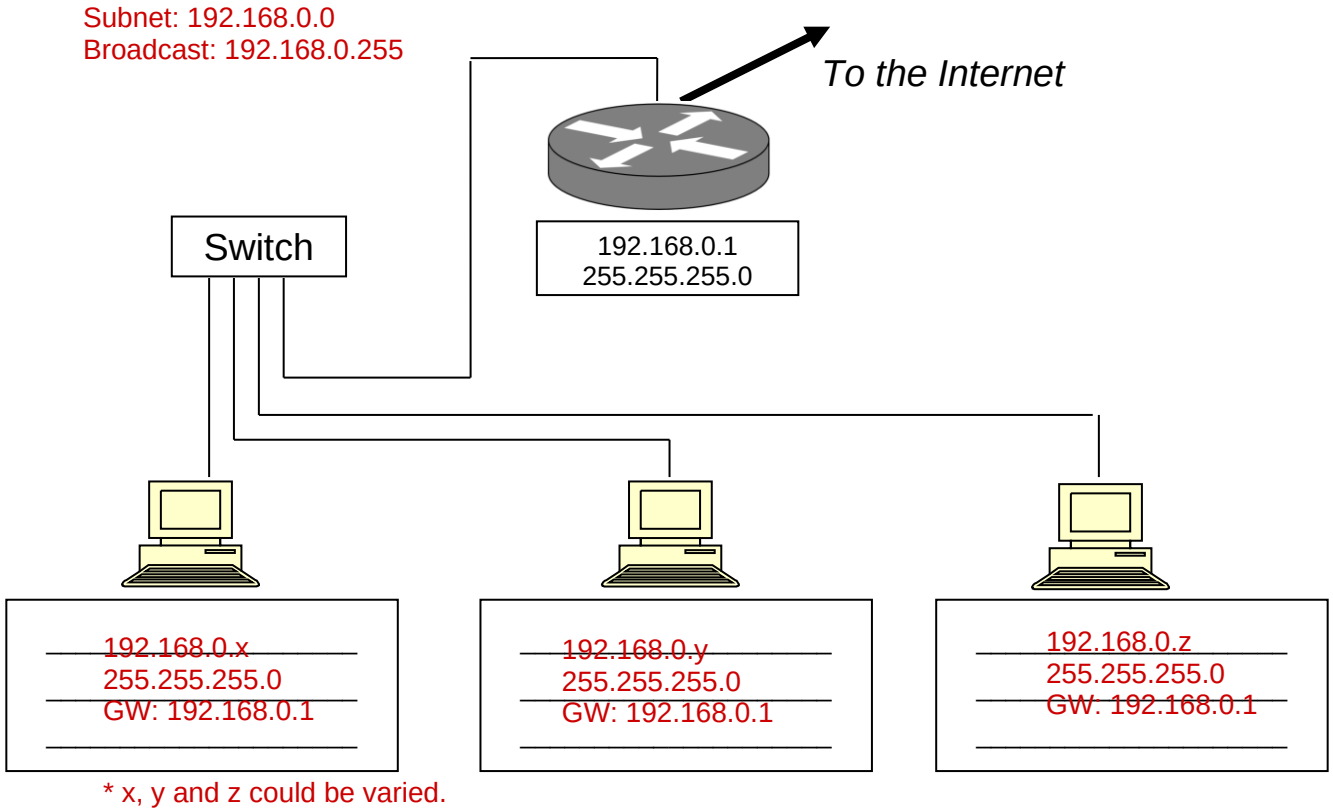
The router, which is a gateway of the local network, connects to the Internet.

How to Solve Subnetting Problems

1. **Subnet Masks:** Start at the gate (the router at the top in these diagrams). Find the subnet mask. Make sure every machine has the same subnet mask. In the example below, the subnet mask is 255.255.255.0
2. **Label the Subnet:** Find the network portion of the IP address of the gate. Fill in the host portion with 0s. Write that label above the network (in the upper left, in these diagrams). In the example below, the gateway has an IP address of 192.168.1.1 and since the subnet mask is 255.255.255.0, the network portion includes only the first 3 bytes. To find the subnet label, replace the last byte with zero: 192.168.1.0.
3. **Label the Broadcast Address:** Find the network portion of the IP address of the gateway. Fill in the host portion with 1s. Write that label above the network (in the upper left, in these diagrams). In the example below, the broadcast address is 192.168.1.255.
4. **Check the IP Addresses**
   - **Network Portion**: Make sure that each NIC on a subnet has the same network address as the label you wrote at the top of the subnet. In the example below, on the left subnet, that means every IP address must start with 192.168.1._
   - **Host Portion**: Make sure that each NIC on a subnet has a different host address, including the default gateway. In the example below, the gateway has a host address of 1, and the others are 101, 102, and 103, so there are no duplicates.
   - **Default Gateway**: On each subnet, the default gateway is the gateway's IP address. It is the same for each NIC on the subnet. In the example below, the gateway has an IP address of 192.168.1.1, so the default gateway must be 192.168.1.1 for all three workstations at the bottom of the chart.

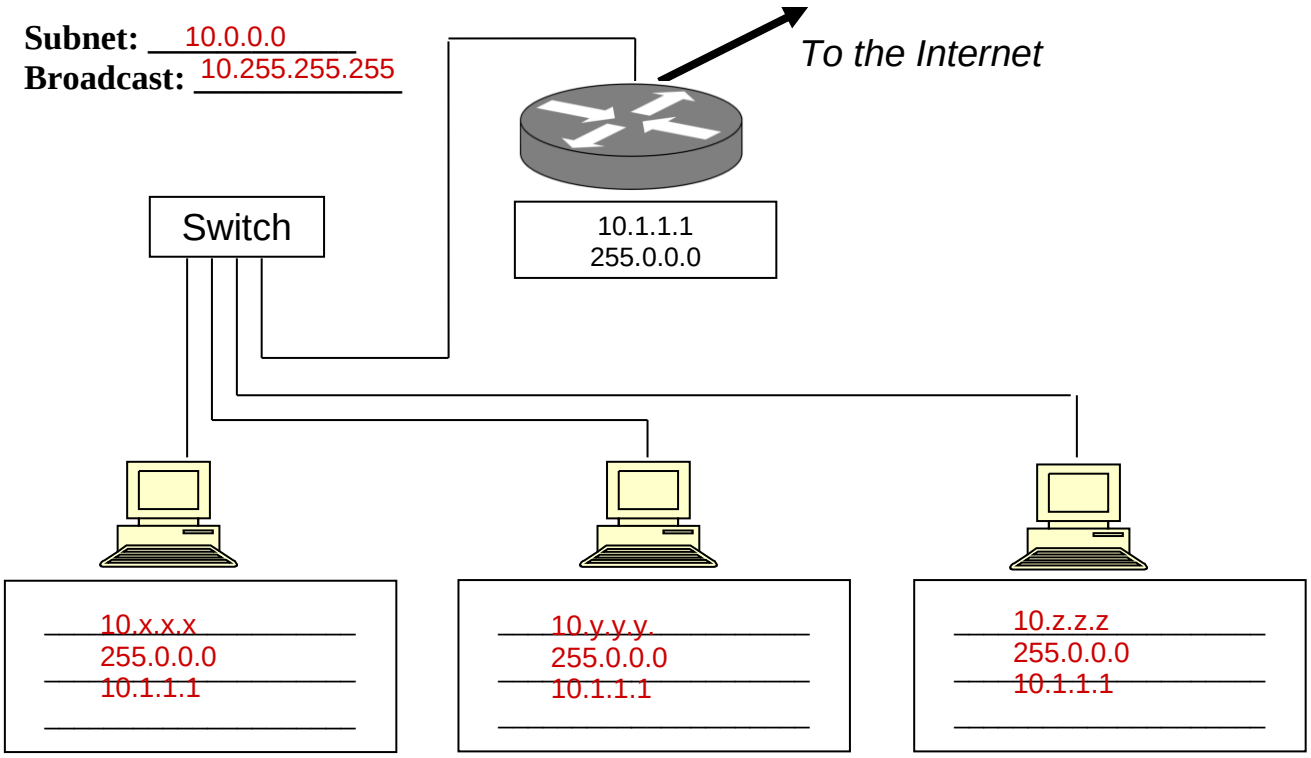

Subnet: 192.168.1.0
Broadcast: 192.168.1.255
To the Internet
Switch
192.168.1.1
255.255.255.0
192.168.1.101
255.255.255.0
192.168.1.1
192.168.1.102
255.255.255.0
192.168.1.1
192.168.1.103
255.255.255.0
192.168.1.1

1. Fill in the missing numbers so this network will operate correctly.

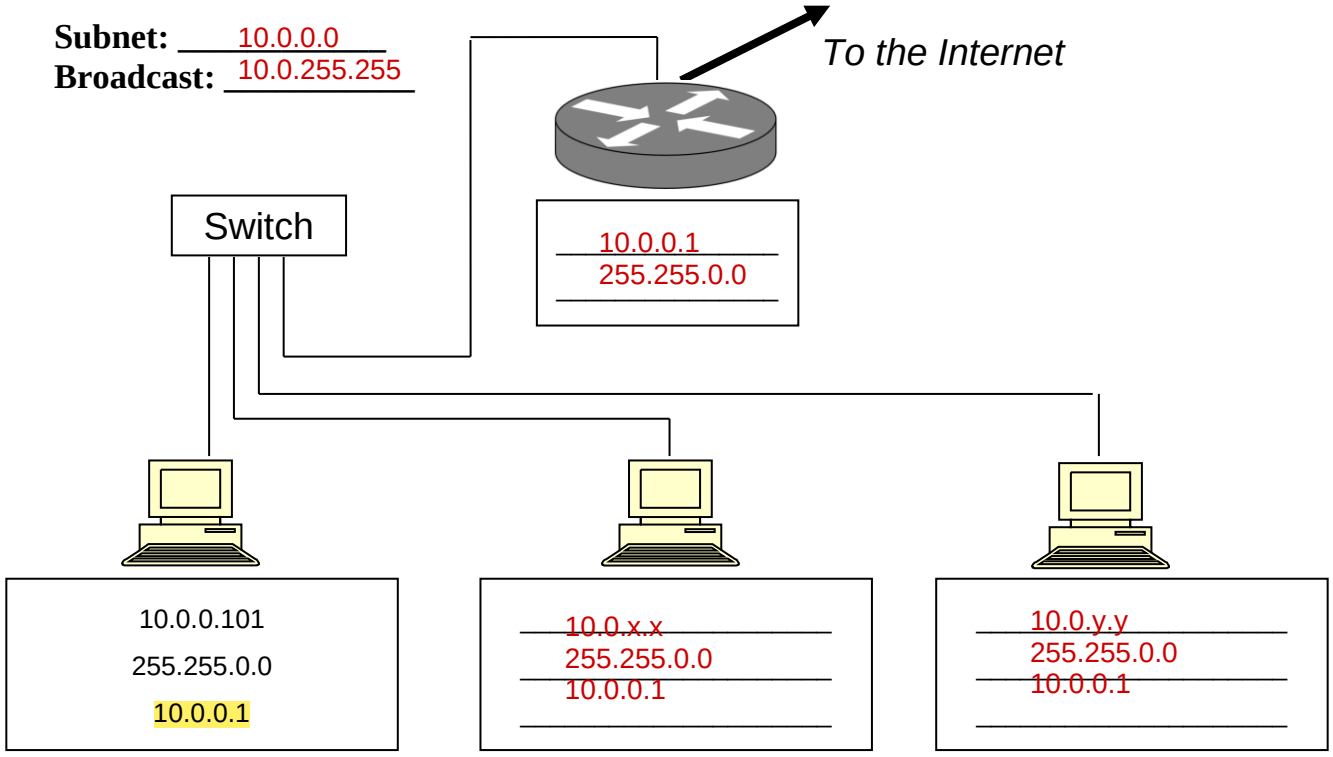


* x, y and z could be varied.

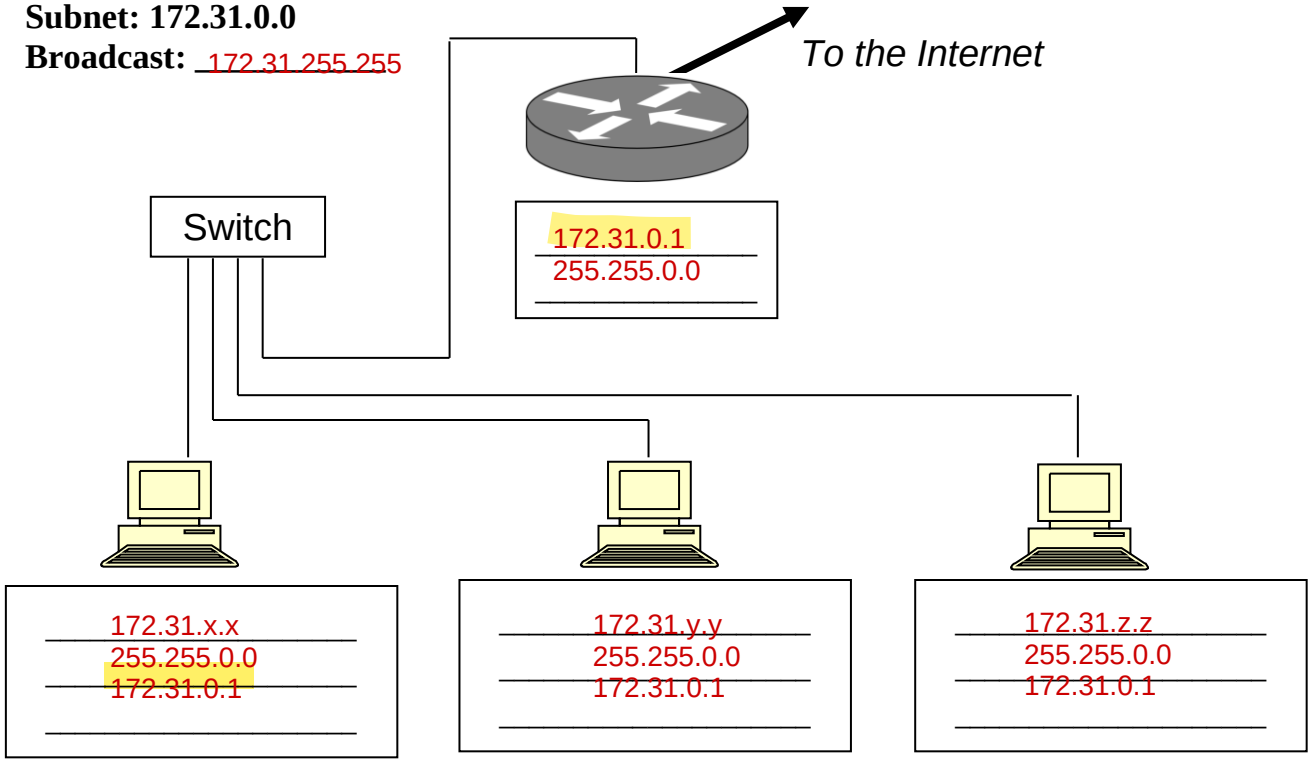
2. Fill in the missing numbers so this network will operate correctly.



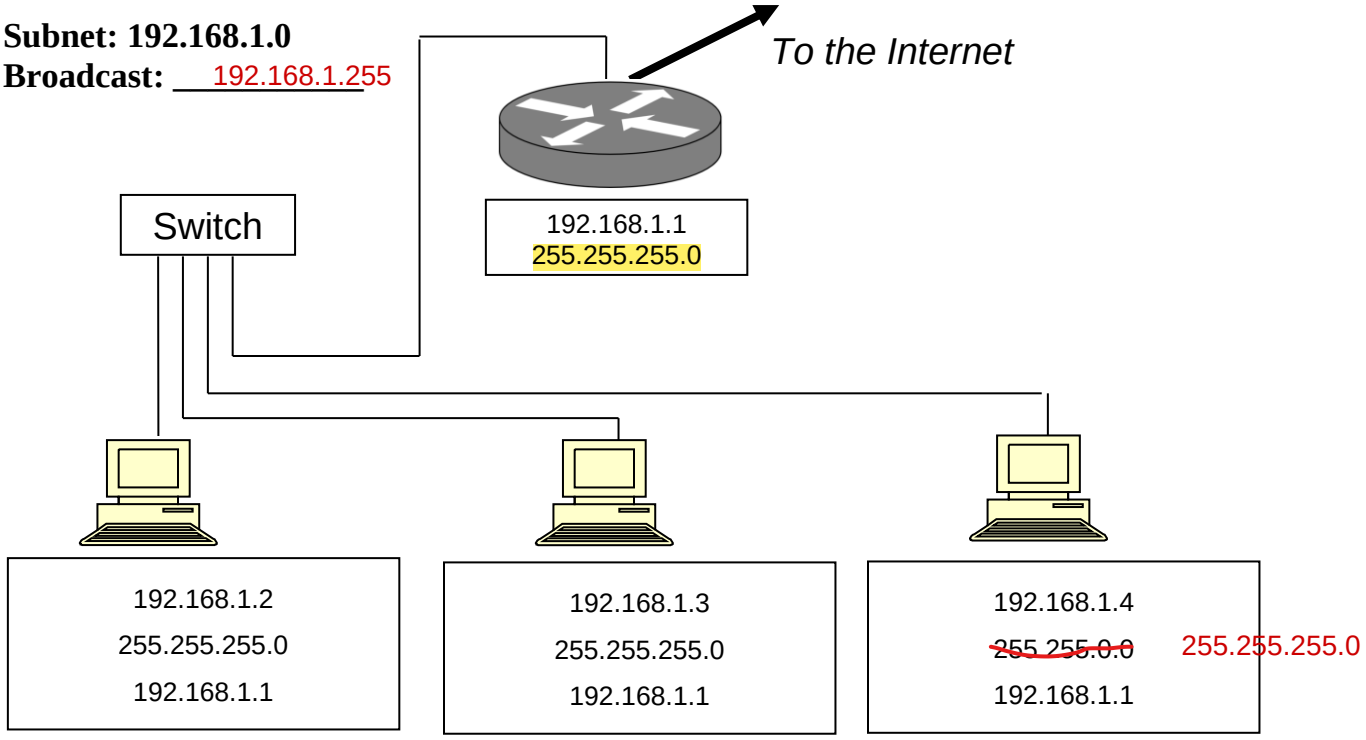
3. Fill in the missing numbers so this network will operate correctly.



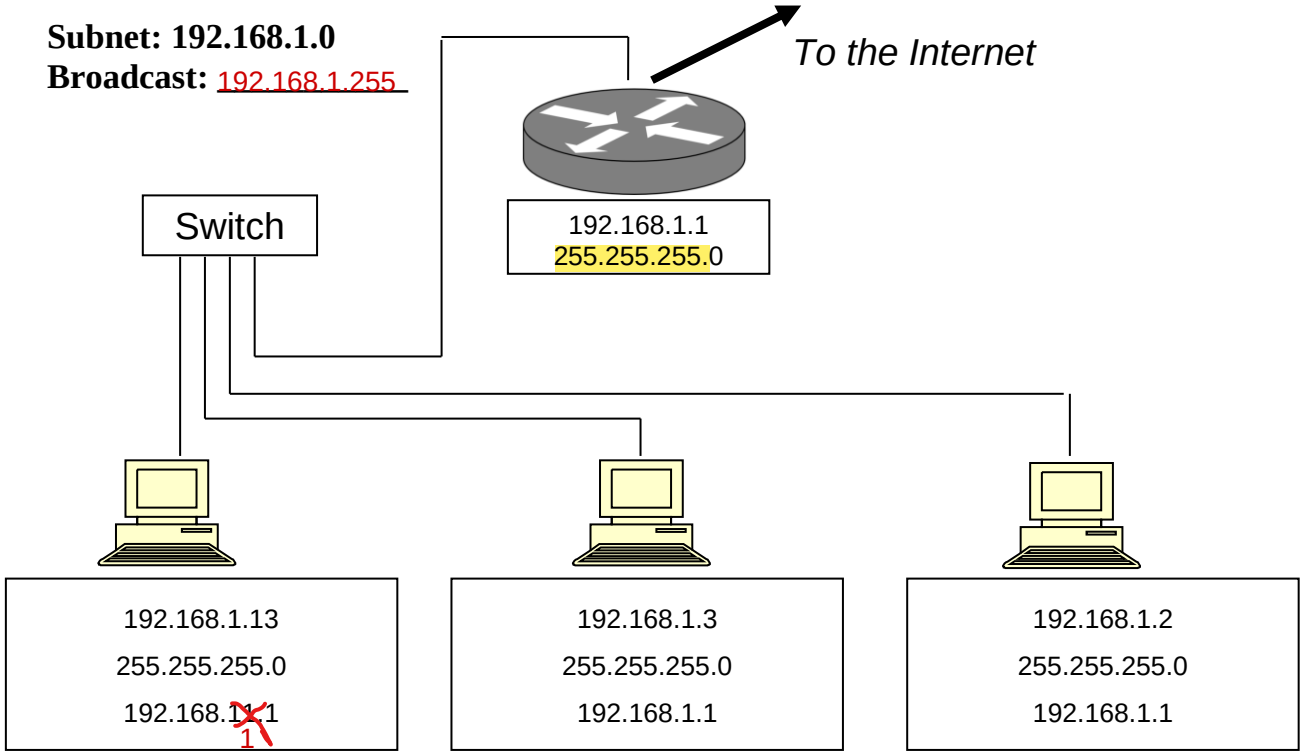
4. Fill in the missing numbers so this network will operate correctly.



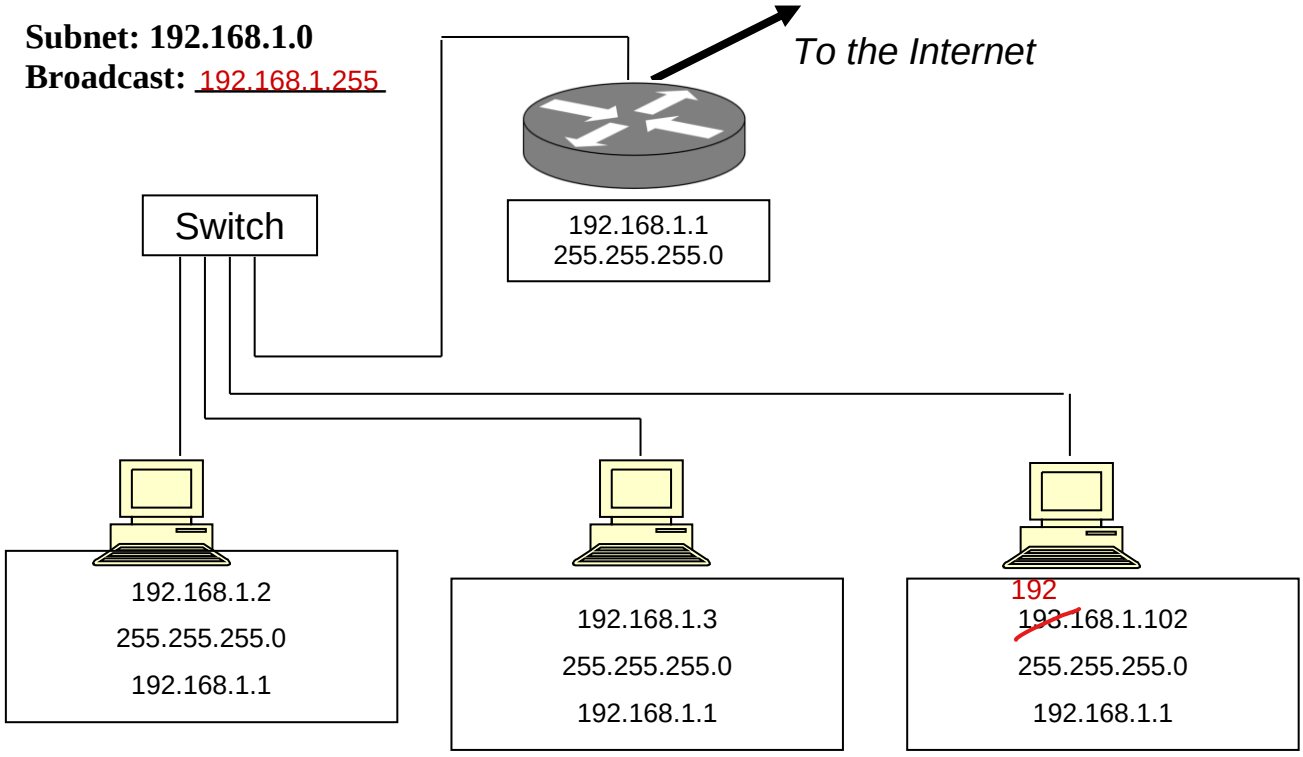
5. Change one number so this network will operate correctly.



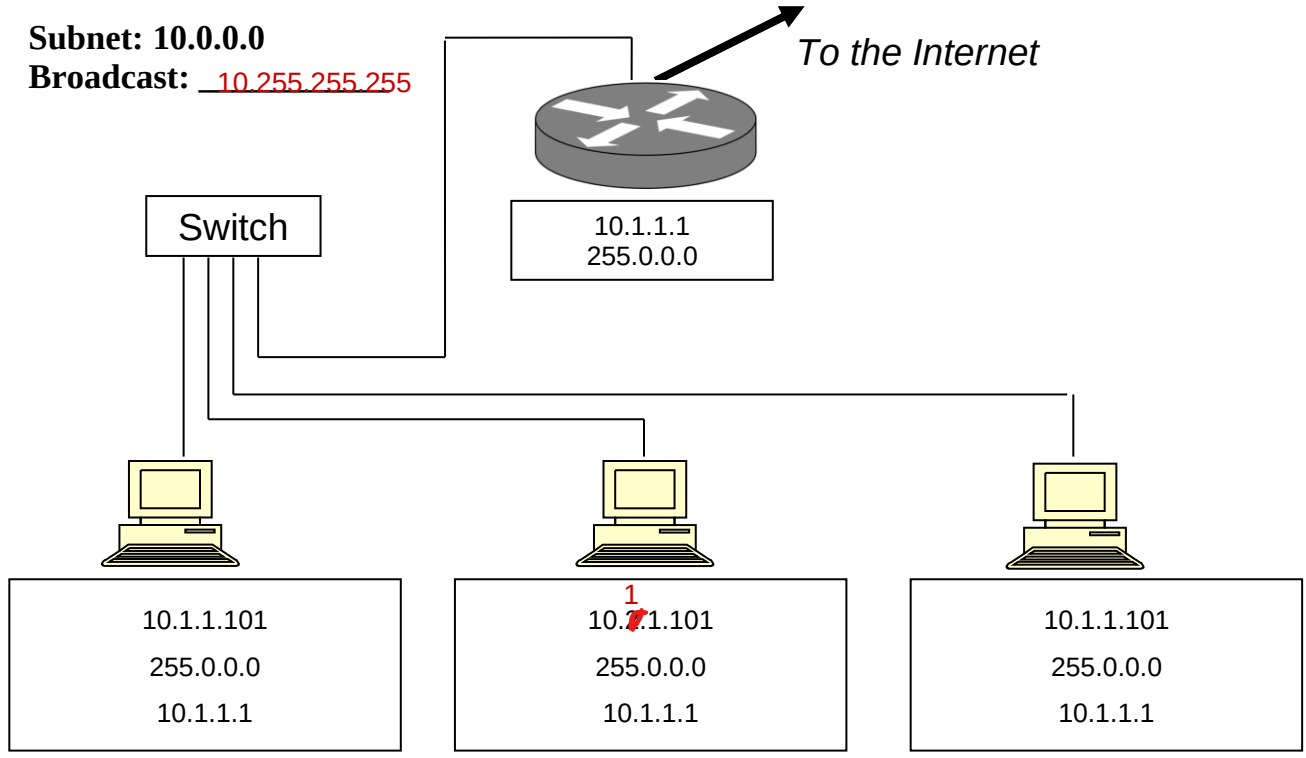
6. Change one number so this network will operate correctly.



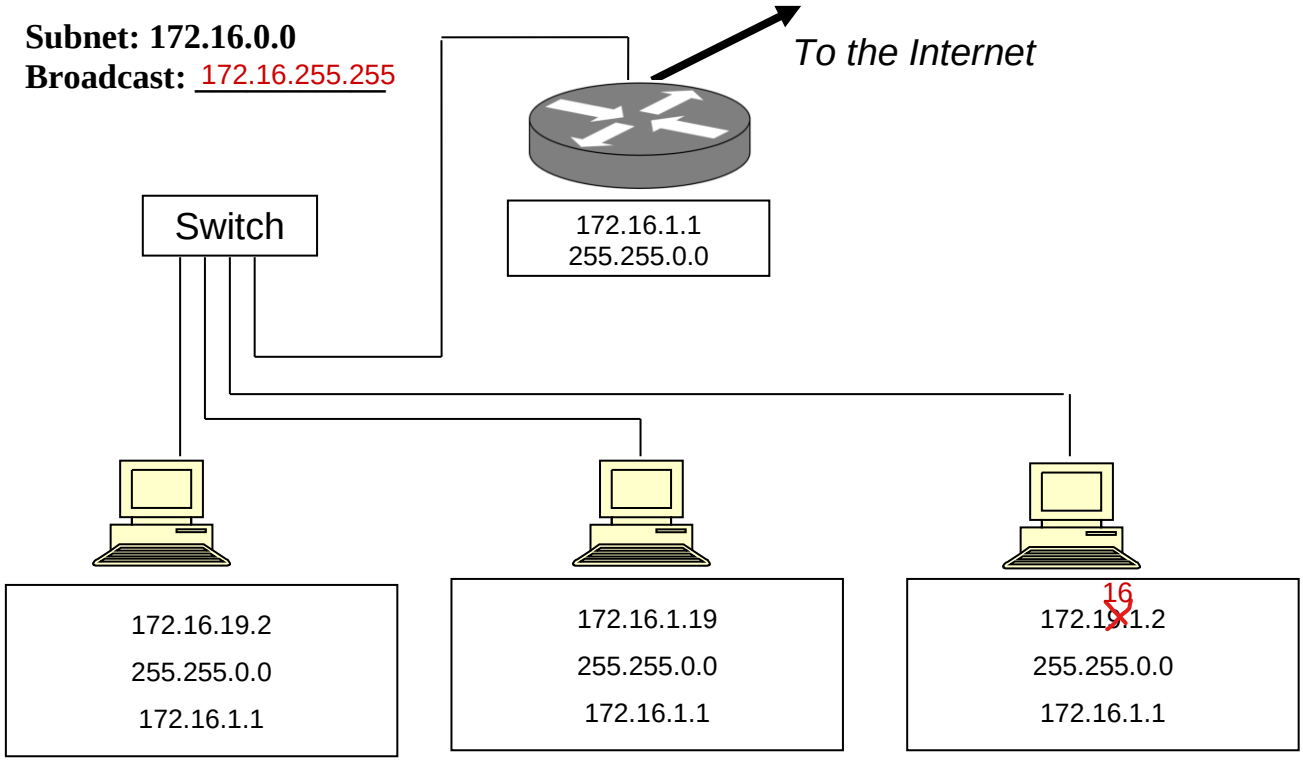
7. Change one number so this network will operate correctly.



8. Change one number so this network will operate correctly.



9. Change one number so this network will operate correctly.



10. Change one number so this network will operate correctly.