NAT (Network Address Translation)

Used to translate a src/dest ip address of a packet to a different one.
Short term solutions before switching to IPV6: CIDR, Private IPV4 addresses, NAT.
Private IPV4 ranges: 10.0.0.0/8 → 10.255.255.255, 172.16.0.0/12 → 172.31.255.255, 192.168.0.0/16 → 192.168.255.255.
Private IP addresses can't be used over the internet, ISP will drop packets from/to private IPs.
NAT allows hosts to borrow the unique IP address of a router or another configured public IP address, NAT allows multiple internal hosts to share the same public IP address.
Static NAT involves statically configuring one-to-one mappings of private IP addresses to public IP addresses, an inside local IP is mapped to an inside global IP.
Inside local: the private address configured on a host. Inside global: the address of the host after NAT.
In static NAT no two hosts can be mapped to the same address.
Static NAT doesn't help to preserve IP addresses, the IP addresses you map to must be registered to you.
On performing NAT, dynamic entries for translations appear → Pro (Protocol used), Port number, Outside local/global.
Outside locaL; the ip address of outside host from perspective of local network.
Outside global: the ip address of outside host from perspective of outside network. (actual ip address).
They don't change unless using destination nat.

Command: ip nat inside on interface to configure as inside interface.
Command: ip nat outside on interface to configure as outside interface.
Command: ip nat inside source static <inside local> <inside global>.
Command: show ip nat translations. Command:clear ip nat translations * to clear dynamic nat entries.
Command: show ip nat statistics.

In dynamic NAT the router dynamically maps inside local addresses to inside global addresses as needed, mappings are cleared when no longer needed, an ACL is used to identify which traffic should be translated (only permitted traffic is translated), a NAT pool is used to define the available inside global addresses, if a packet from another inside host arrives and there is no available NAT, the router will drop the packet, default timeout is 24 hours and timer resets with each translation.
Command: ip nat pool <pool-name> <start ip> <end ip> prefix-length/netmask <netmask> to check range is in the same subnet else rejected.
Command: ip nat inside source list <access list name> pool <pool name>

PAT (NAT overload): translates the IP address and the port number if necessary (many to one mappings).
Command: ip nat inside source list <access list name> pool <pool name> overload.
Command: ip nat inside source list <access list name> interface <interface> overload.