Question 3 Answers

1.
```
coder@a446fe60c45e:~$ echo "This is a sample text" > sample_data.txt
```
We used echo command to add text to a file while also creating a new file.

2.
```
coder@a446fe60c45e:~$ ln sample_data.txt sample_hard.txt
```
Ln command is used to create a hard link to an existing file. Hard links have same inode as original files.

3.
```
coder@a446fe60c45e:~$ ln -s sample_data.txt sample_soft.txt
```
Ln -s command is used to create symbolic or soft links to a file. These links have a different inode that the original file and can even be created across directories.

4.
```
coder@a446fe60c45e:~$ ls -li sample_data.txt sample_hard.txt sample_soft.txt
229638 -rw-r--r-- 2 coder coder 22 Dec 30 23:05 sample_data.txt
229638 -rw-r--r-- 2 coder coder 22 Dec 30 23:05 sample_hard.txt
231439 lrwxrwxrwx 1 coder coder 15 Dec 30 23:06 sample_soft.txt -> sample_data.tx
t
```
We used the ls command to display the inodes of all the files with the new links that we created.

5. We note that the original file sample_data.txt and sample_hard.txt share the same inode numbers because hard links refer to the same disk locations. However, symbolic links have different inode numbers they only store the file path for original files.

6.
```
coder@a446fe60c45e:~$ ls -l sample_data.txt
-rw-r--r-- 2 coder coder 22 Dec 30 23:05 sample_data.txt
```

The ls -l command along with file name is used to display the file's permissions, ownership, group, size and timestamps.

7.

```
coder@a446fe60c45e:~$ du -sh
8.9M    .
```

Here we used du -sh command to check disk usage. Be careful while typing this command as using only '-h' instead of '-sh' can result in an extremely lengthy answer which is very confusing to interpret. The "s" here signifies summary.

8.

```
coder@a446fe60c45e:~$ ls -lh
total 30K
drwxr-xr-x  4 coder  coder      4 Dec 30 21:45 coursera
drwxr-xr-x  3 coder  coder      3 Jun 26  2023 data
drwxrwxrwx  2 nobody nogroup 6.0K Dec 29 17:46 Desktop
drwxr-xr-x  2 root   root    6.0K Dec 17 04:28 Desktop-ro
drwxr-xr-x  2 coder  coder      4 Jun 26  2023 Desktop.save
drwxr-xr-x  2 coder  coder      2 Dec 30 21:45 Documents
drwxr-xr-x  2 coder  coder      2 Dec 30 21:45 Downloads
drwxr-xr-x  2 coder  coder     13 Jun 26  2023 install
drwxr-xr-x  2 coder  coder      2 Dec 30 21:45 Music
drwxr-xr-x 20 coder  coder     21 Jun 26  2023 node_modules
drwxr-xr-x  9 coder  coder     20 Jun 26  2023 noVNC
-rw-r--r--  1 coder  coder     75 Jun 26  2023 package.json
-rw-r--r--  1 coder  coder    12K Jun 26  2023 package-lock.json
drwxr-xr-x  2 coder  coder      2 Dec 30 21:45 Pictures
drwxr-xr-x  3 coder  coder      4 Dec 30 22:52 project_documents
drwxr-xr-x  2 coder  coder      2 Dec 30 21:45 Public
-rw-r--r--  2 coder  coder     22 Dec 30 23:05 sample_data.txt
-rw-r--r--  2 coder  coder     22 Dec 30 23:05 sample_hard.txt
lrwxrwxrwx  1 coder  coder     15 Dec 30 23:06 sample_soft.txt -> sample_data.txt
drwxr-xr-x  2 coder  coder      2 Dec 30 21:45 Templates
-rw-r--r--  1 coder  coder     32 Dec 30 21:54 user_info.txt
drwxr-xr-x  2 coder  coder      2 Dec 30 21:45 Videos
-rw-r--r--  1 coder  coder     60 Dec 30 21:45 wm.log
-rwxr-xr-x  1 coder  coder    308 Jun 26  2023 wm_startup.sh
drwxr-xr-x  2 coder  coder      2 Jun 26  2023 workspace
-rwxr-xr-x  1 coder  coder    314 Jun 26  2023 wrapper_process.sh
```

The ls -lh command is used t display a list of files and directories along with their size, permissions, timestamp, owner, group.

9.

```
coder@a446fe60c45e:~$ rm sample_soft.txt
coder@a446fe60c45e:~$ cat sample_data.txt
This is a sample text
```

The rm command is used to delete the sample_soft.txt file that signifies the soft link. The cat command is used to confirm that the original file remains unaffected even when we delete the soft link file.

10.

```
coder@a446fe60c45e:~$ du -h --max-depth=1 ~
1.0K    /home/coder/.java
10K     /home/coder/data
340K    /home/coder/.config
2.2M    /home/coder/node_modules
4.0K    /home/coder/Desktop-ro
512     /home/coder/.gvfs
3.1M    /home/coder/noVNC
13K     /home/coder/Desktop.save
8.5K    /home/coder/.vnc
512     /home/coder/Documents
14K     /home/coder/install
512     /home/coder/Public
512     /home/coder/workspace
107K    /home/coder/.cache
512     /home/coder/Templates
16K     /home/coder/Desktop
512     /home/coder/Music
1.3M    /home/coder/.local
2.0K    /home/coder/.dbus
512     /home/coder/Pictures
4.5K    /home/coder/coursera
4.0K    /home/coder/.gnupg
512     /home/coder/Videos
3.0K    /home/coder/project_documents
512     /home/coder/Downloads
512     /home/coder/.eclipse
```

```
coder@a446fe60c45e:~$ df -h
Filesystem
                Size  Used Avail Use% Mounted on
dockerPool/b5e3bcbe1e04c7d34e4b2e717ea44c159826557c0c7752c0ffcdae657d734808
                 13G  3.7G  9.4G  29% /
tmpfs
                 64M     0   64M   0% /dev
shm
                 64M     0   64M   0% /dev/shm
dockerPool
                223G  6.7G  216G   3% /etc/hosts
fs-096477e837a108781.efs.us-east-1.amazonaws.com:/workspaces/xfujncuvyndw/volumes
/DByYRLOa/files  8.0E   98T  8.0E   1% /home/coder/Desktop
fs-096477e837a108781.efs.us-east-1.amazonaws.com:/templates/iTqOPTcr/v1/files
                8.0E   98T  8.0E   1% /home/coder/Desktop-ro
devtmpfs
                125G     0  125G   0% /dev/tty
tmpfs
                125G     0  125G   0% /proc/acpi
tmpfs
                125G     0  125G   0% /proc/scsi
tmpfs
                125G     0  125G   0% /sys/firmware
```

The du -h command shows a list of all files and directories currently using the disk space and how much exactly each one is using. And the df -h command shows us the disk usage by filesystem. Both can be used to analyse the disk space usage.