Aim: Find the outlier using trimming and capping method.

In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings("ignore")
```

In [2]:

```
df = pd.read_csv("placement.csv")
df.rename(columns = {'placement_exam_marks':'marks'}, inplace = True)
df.sample(5)
```

Out[2]:

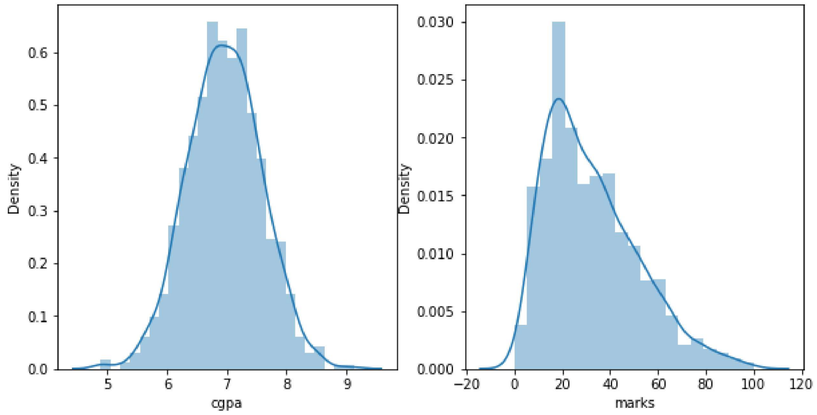
	cgpa	marks	placed
455	6.92	43	0
527	7.72	37	0
911	7.45	36	1
269	6.47	16	0
420	7.59	49	0

In [3]:

```
plt.figure(figsize=(10,5))
plt.subplot(1,2,1)
sns.distplot(df["cgpa"])

plt.subplot(1,2,2)
sns.distplot(df["marks"])
```

Out[3]:

```
<AxesSubplot:xlabel='marks', ylabel='Density'>
```



In [4]:

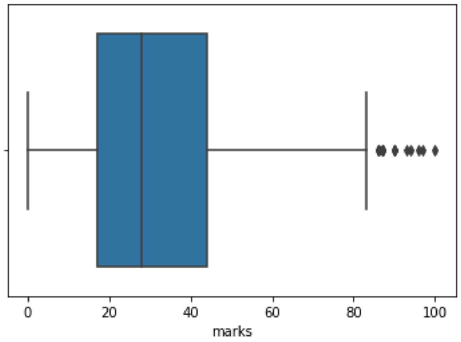
```
df["marks"].describe()
```

Out[4]:

```
count    1000.000000
mean       32.225000
std        19.130822
min         0.000000
25%        17.000000
50%        28.000000
75%        44.000000
max       100.000000
Name: marks, dtype: float64
```

In [5]:
```
sns.boxplot(df["marks"])
```

Out[5]:
```
<AxesSubplot:xlabel='marks'>
```



In [6]:
```
#finding boundries values
print("Highest Boundary value for CGPA:",df["cgpa"].mean() + 3*df["cgpa"].std())
print("Lowest Boundary value for CGPA:",df["cgpa"].mean() - 3*df["cgpa"].std())
```

```
Highest Boundary value for CGPA: 8.808933625397177
Lowest Boundary value for CGPA: 5.113546374602842
```

In [7]:
```
#finding outliers
df[(df["cgpa"]>8.80) | (df["cgpa"]<5.11)]
```

Out[7]:

	cgpa	marks	placed
485	4.92	44	1
995	8.87	44	1
996	9.12	65	1
997	4.89	34	0
999	4.90	10	1

Trimming

In [8]:
```
df.shape
```

Out[8]:
```
(1000, 3)
```

In [9]:
```
data = df[(df["cgpa"]<8.80) & (df["cgpa"]>5.11)]
data.sample(5)
```

Out[9]:

	cgpa	marks	placed
202	6.51	48	1
564	7.17	34	1
619	6.81	43	0
290	8.38	87	0
964	8.09	54	1

In [10]:
```
data.shape
```

Out[10]:
```
(995, 3)
```

z-score

z = xi - x_mean/S.D

In [11]:
```
df["cgpa_score"] = (df["cgpa"] - df["cgpa"].mean())/df["cgpa"].std()
```

In [12]:

```
df.head()
```

Out[12]:

	cgpa	marks	placed	cgpa_score
0	7.19	26	1	0.371425
1	7.46	38	1	0.809810
2	7.54	40	1	0.939701
3	6.42	8	1	-0.878782
4	7.23	17	0	0.436371

In [13]:

```
df["cgpa_score"].describe()
```

Out[13]:

```
count    1.000000e+03
mean    -1.600275e-14
std      1.000000e+00
min     -3.362960e+00
25%     -6.677081e-01
50%     -2.013321e-03
75%      6.636815e-01
max      3.505062e+00
Name: cgpa_score, dtype: float64
```

In [14]:

```
df[df["cgpa_score"] > 3]
```

Out[14]:

	cgpa	marks	placed	cgpa_score
995	8.87	44	1	3.099150
996	9.12	65	1	3.505062

In [15]:

```
df[df["cgpa_score"] < -3]
```

Out[15]:

	cgpa	marks	placed	cgpa_score
485	4.92	44	1	-3.314251
997	4.89	34	0	-3.362960
999	4.90	10	1	-3.346724

In [25]:

```
df2 = df[(df["cgpa_score"] > 3) | (df["cgpa_score"] < -3)]
df2
```

Out[25]:

	cgpa	marks	placed	cgpa_score	cgpa_cap
485	4.92	44	1	-3.314251	5.113546
995	8.87	44	1	3.099150	8.808934
996	9.12	65	1	3.505062	8.808934
997	4.89	34	0	-3.362960	5.113546
999	4.90	10	1	-3.346724	5.113546

In [27]:

```
df1 = df[(df["cgpa_score"] < 3) & (df["cgpa_score"] > -3)]
df1.sample(5)
```

Out[27]:

	cgpa	marks	placed	cgpa_score	cgpa_cap
326	7.54	13	0	0.939701	7.54
608	7.33	16	1	0.598736	7.33
544	7.11	14	1	0.241534	7.11
439	6.67	10	1	-0.472871	6.67
903	7.56	28	1	0.972174	7.56

In [17]:

```
df1.shape
```

Out[17]:

```
(995, 4)
```

Capping

In [18]:

```
upper_limit = df["cgpa"].mean() + 3*df["cgpa"].std()
lower_limit = df["cgpa"].mean() - 3*df["cgpa"].std()
print("Upper Limit:",upper_limit)
print("Lower Limit:",lower_limit)
```

```
Upper Limit: 8.808933625397177
Lower Limit: 5.113546374602842
```

In [19]:
```
#np.where(x,y,z)
df["cgpa_cap"] = np.where(df["cgpa"]>upper_limit,upper_limit,
                 np.where(df["cgpa"]<lower_limit,lower_limit,df["cgpa"]))
```

In [20]:
```
df["cgpa_cap"]
```

Out[20]:
```
0      7.190000
1      7.460000
2      7.540000
3      6.420000
4      7.230000
         ...
995    8.808934
996    8.808934
997    5.113546
998    8.620000
999    5.113546
Name: cgpa_cap, Length: 1000, dtype: float64
```

In [21]:
```
df.describe()
```

Out[21]:

	cgpa	marks	placed	cgpa_score	cgpa_cap
count	1000.000000	1000.000000	1000.000000	1.000000e+03	1000.000000
mean	6.961240	32.225000	0.489000	-1.600275e-14	6.961499
std	0.615898	19.130822	0.500129	1.000000e+00	0.612688
min	4.890000	0.000000	0.000000	-3.362960e+00	5.113546
25%	6.550000	17.000000	0.000000	-6.677081e-01	6.550000
50%	6.960000	28.000000	0.000000	-2.013321e-03	6.960000
75%	7.370000	44.000000	1.000000	6.636815e-01	7.370000
max	9.120000	100.000000	1.000000	3.505062e+00	8.808934

In [28]:
```
df["marks"].skew()
```

Out[28]:
```
0.8356419499466834
```

In [34]:
```
quartile_25 = df["marks"].quantile(0.25)
quartile_25
```

Out[34]:
```
17.0
```

In [35]:
```
quartile_75 = df["marks"].quantile(0.75)
quartile_75
```

Out[35]:
```
44.0
```

In [36]:
```
iqr = quartile_75 - quartile_25
iqr
```

Out[36]:
```
27.0
```

In [37]:
```
upper_limit = quartile_75 + 1.5*iqr
upper_limit
```

Out[37]:
```
84.5
```

In [38]:
```
lower_limit = quartile_25 - 1.5*iqr
lower_limit
```

Out[38]:
```
-23.5
```

In [49]:
```
df[df["marks"] > upper_limit]
```

Out[49]:

	cgpa	marks	placed	cgpa_score	cgpa_cap
9	7.75	94	1	1.280667	7.75
40	6.60	86	1	-0.586526	6.60
61	7.51	86	0	0.890992	7.51
134	6.33	93	0	-1.024910	6.33
162	7.80	90	0	1.361849	7.80
283	7.09	87	0	0.209061	7.09
290	8.38	87	0	2.303564	8.38
311	6.97	87	1	0.014223	6.97
324	6.64	90	0	-0.521580	6.64
630	6.56	96	1	-0.651472	6.56
685	6.05	87	1	-1.479531	6.05
730	6.14	90	1	-1.333403	6.14
771	7.31	86	1	0.566263	7.31
846	6.99	97	0	0.046696	6.99
917	5.95	100	0	-1.641896	5.95

In [46]:
```
new_dff = df[df["marks"] < upper_limit]
new_dff
```

Out[46]:

	cgpa	marks	placed	cgpa_score	cgpa_cap
0	7.19	26	1	0.371425	7.190000
1	7.46	38	1	0.809810	7.460000
2	7.54	40	1	0.939701	7.540000
3	6.42	8	1	-0.878782	6.420000
4	7.23	17	0	0.436371	7.230000
...	...	...	...	...	...
995	8.87	44	1	3.099150	8.808934
996	9.12	65	1	3.505062	8.808934
997	4.89	34	0	-3.362960	5.113546
998	8.62	46	1	2.693239	8.620000
999	4.90	10	1	-3.346724	5.113546

985 rows × 5 columns

In [47]:
```
new_dff.shape
```

Out[47]:
```
(985, 5)
```

In [42]:
```
df[df["marks"] < lower_limit]
```

Out[42]:

cgpa	marks	placed	cgpa_score	cgpa_cap

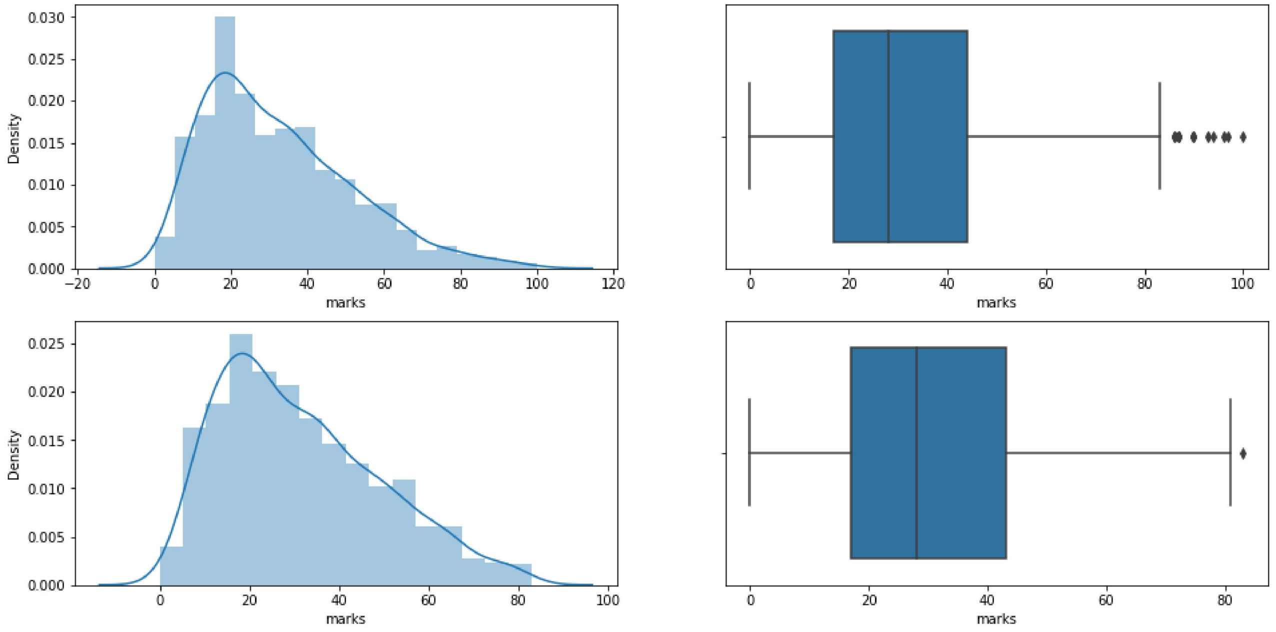
Trimming

In [53]:

```python
#Comparing
plt.figure(figsize=(16,8))
plt.subplot(2,2,1)
sns.distplot(df["marks"])

plt.subplot(2,2,2)
sns.boxplot(df["marks"])

plt.subplot(2,2,3)
sns.distplot(new_dff["marks"])

plt.subplot(2,2,4)
sns.boxplot(new_dff["marks"])
```

Out[53]:

```
<AxesSubplot:xlabel='marks'>
```



In [54]:

```python
new_df_cap = df.copy()
```

In [55]:

```python
new_df_cap["marks"] = np.where(new_df_cap["marks"]>upper_limit,upper_limit,
                  np.where(new_df_cap["marks"]<lower_limit,lower_limit,new_df_cap["marks"]))
```

In [56]:

```python
#np.where(condition,true.false)
```

In [58]:

```python
new_df_cap["marks"]
```

Out[58]:

```
0      26.0
1      38.0
2      40.0
3       8.0
4      17.0
       ...
995    44.0
996    65.0
997    34.0
998    46.0
999    10.0
Name: marks, Length: 1000, dtype: float64
```

In [59]:

```
new_df_cap
```

Out[59]:

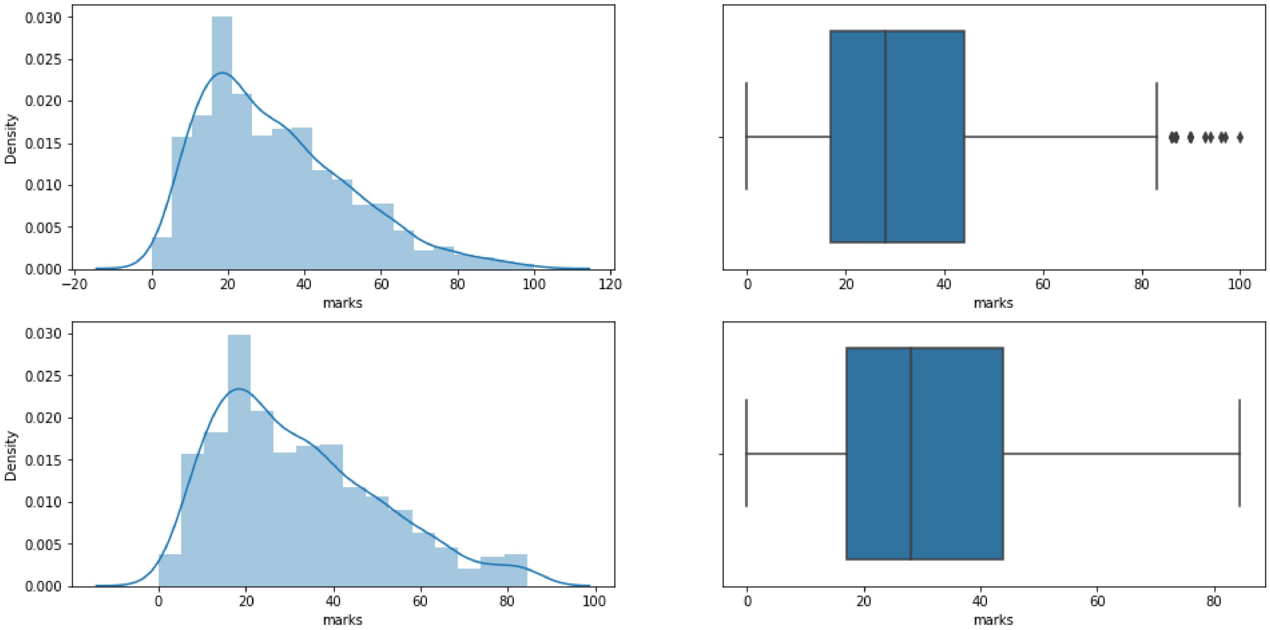
```
     cgpa  marks  placed  cgpa_score  cgpa_cap
0    7.19   26.0       1    0.371425  7.190000
1    7.46   38.0       1    0.809810  7.460000
2    7.54   40.0       1    0.939701  7.540000
3    6.42    8.0       1   -0.878782  6.420000
4    7.23   17.0       0    0.436371  7.230000
...   ...    ...     ...         ...       ...
995  8.87   44.0       1    3.099150  8.808934
996  9.12   65.0       1    3.505062  8.808934
997  4.89   34.0       0   -3.362960  5.113546
998  8.62   46.0       1    2.693239  8.620000
999  4.90   10.0       1   -3.346724  5.113546

1000 rows × 5 columns
```

In [60]:

```
#Comparing
plt.figure(figsize=(16,8))
plt.subplot(2,2,1)
sns.distplot(df["marks"])

plt.subplot(2,2,2)
sns.boxplot(df["marks"])

plt.subplot(2,2,3)
sns.distplot(new_df_cap["marks"])

plt.subplot(2,2,4)
sns.boxplot(new_df_cap["marks"])
```

Out[60]:

```
<AxesSubplot:xlabel='marks'>
```



In [ ]:

```

```