```
import pandas as pd

import numpy as np

data = {
    'id' : [101,102,103,104,105,106],
    'math_score': [88,92,np.nan,45,99,300],
    'science_score':[85,79,91,76,88,60],

    'english_score':[78,85,80,np.nan,82,74],
    'attendace':[92,87,90,85,100,40]
}

df = pd.DataFrame(data)

df
```

	id	math_score	science_score	english_score	attendace
0	101	88.0	85	78.0	92
1	102	92.0	79	85.0	87
2	103	NaN	91	80.0	90
3	104	45.0	76	NaN	85
4	105	99.0	88	82.0	100
5	106	300.0	60	74.0	40

```
df.isnull().sum()
```

```
id               0
math_score       1
science_score    0
english_score    1
attendace        0
dtype: int64
```

```
df['math_score'].fillna(df['math_score'].mean().inplace = True)
```

```
  Cell In[21], line 1
    df['math_score'].fillna(df['math_score'].mean().inplace = True)
                                                    ^
SyntaxError: expression cannot contain assignment, perhaps you meant
"=="?
```

```
df['math_score'] = df['math_score'].fillna(df['math_score'].mean())

df
```

	id	math_score	science_score	english_score	attendace
0	101	88.0	85	78.0	92
1	102	92.0	79	85.0	87
2	103	124.8	91	80.0	90
3	104	45.0	76	NaN	85

```
4  105        99.0             88           82.0         100
5  106       300.0             60           74.0          40
```

```
df['english_score'] =
df['english_score'].fillna(df['english_score'].mean())
```

```
df
```

```
    id  math_score  science_score  english_score  attendace
0  101        88.0             85           78.0         92
1  102        92.0             79           85.0         87
2  103       124.8             91           80.0         90
3  104        45.0             76           79.8         85
4  105        99.0             88           82.0        100
5  106       300.0             60           74.0         40
```

```
def detect_outliers_iqr(col):
    q1 = col.quantile(.25)
    q3 = col.quantile(.75)
    iqr = q3-q1
    lower_bound = q1 - 1.5 * iqr
    upper_bound = q3 + 1.5 * iqr
    return col[(col<lower_bound) | (col>upper_bound)]

outlier_math = detect_outliers_iqr(df['math_score'])
outlier_attendence = detect_outliers_iqr(df['attendace'])

print("Math Score Outliers:\n",outlier_math)
```

```
Math Score Outliers:
 5    300.0
Name: math_score, dtype: float64
```

```
def cap_outliers(col):
    q1 = col.quantile(.25)
    q3 = col.quantile(.75)
    iqr = q3 - q1
    lb = q1 - 1.5 * iqr
    ub = q3 + 1.5 * iqr
    col = np.where(col>ub,ub,col)
    col = np.where(col<lb,lb,col)
    return col

df['math_score'] = cap_outliers(df['math_score'])

df['attendace'] = cap_outliers(df['attendace'])

df
```

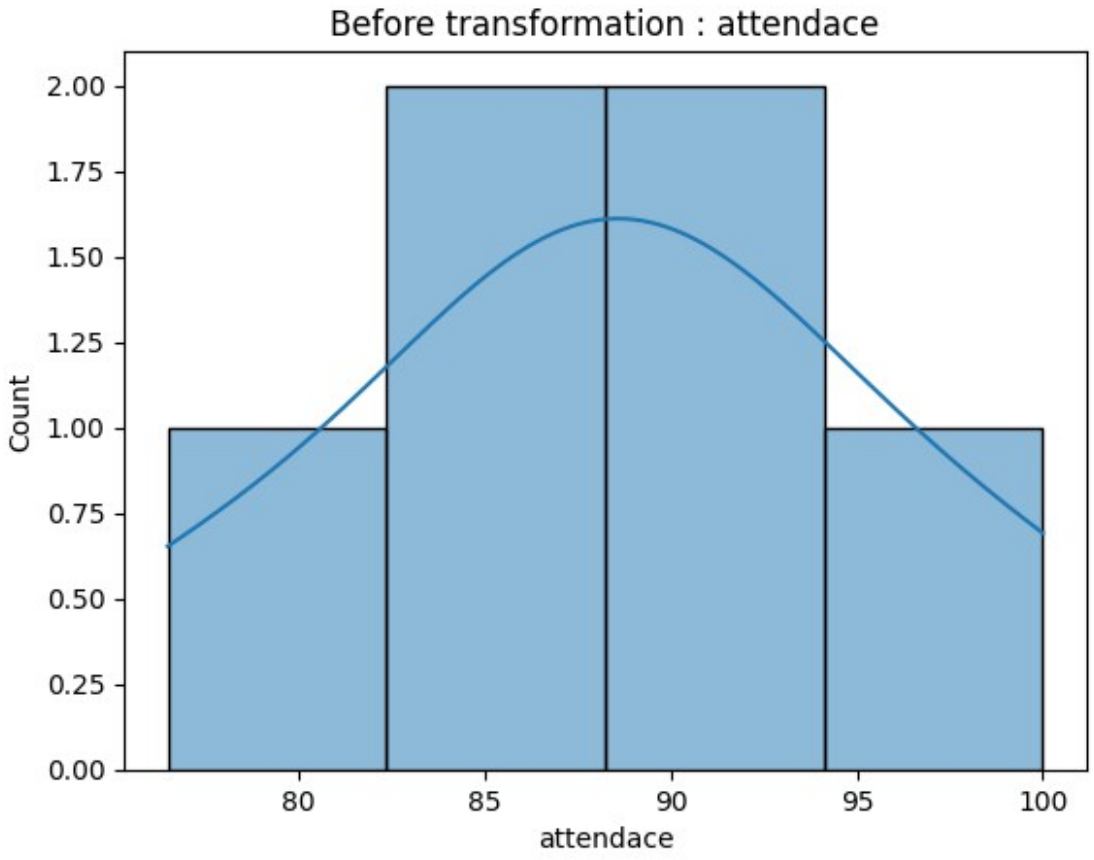
```
    id  math_score  science_score  english_score  attendace
0  101      88.000             85           78.0       92.0
1  102      92.000             79           85.0       87.0
```

```
2  103     124.800              91            80.0        90.0
3  104      45.000              76            79.8        85.0
4  105      99.000              88            82.0       100.0
5  106     162.375              60            74.0        76.5
```

```
import matplotlib.pyplot as plt

import seaborn as sns

sns.histplot(df['attendace'],kde = True)
plt.title('Before transformation : attendace')
plt.show()
```




```
df['log_attendace'] = np.log1p(df['attendace'])

sns.histplot(df['log_attendace'],kde = True)
plt.title("After log transformation : Attendace Percentage")
plt.show()
```