```
import numpy as np
from scipy.stats import *
import pandas as pd
```

백분위수 및 사분위수 계산

```
x = np.arange(1, 12, 1)
print(x)
```

```
[ 1  2  3  4  5  6  7  8  9 10 11]
```

```
print(np.percentile(x, 20))
print(np.quantile(x, 0.2)) # 사실상 같음
```

```
3.0
3.0
```

```
print(np.percentile(x, 25))
print(np.quantile(x, 0.25)) # 사실상 같음
```

```
3.5
3.5
```

왜도 계산

```
%matplotlib inline
from matplotlib import pyplot as plt
x1 = [1] * 30 + [2] * 20 + [3] * 20 + [4] * 15 + [5] * 15 # 좌측으로 치우침
x2 = [1] * 15 + [2] * 20 + [3] * 30 + [4] * 20 + [5] * 15 # 치우치지 않음
x3 = [1] * 15 + [2] * 15 + [3] * 20 + [4] * 20 + [5] * 30 # 우측으로 치우침
```

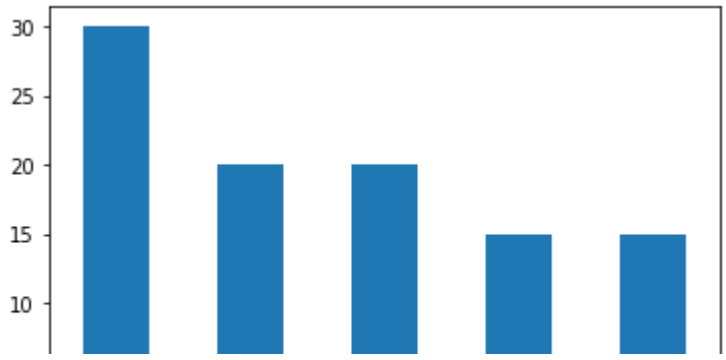
```
x1
```

```
pd.Series(x1).value_counts(sort = False)
```

```
1    30
2    20
3    20
4    15
5    15
dtype: int64
```

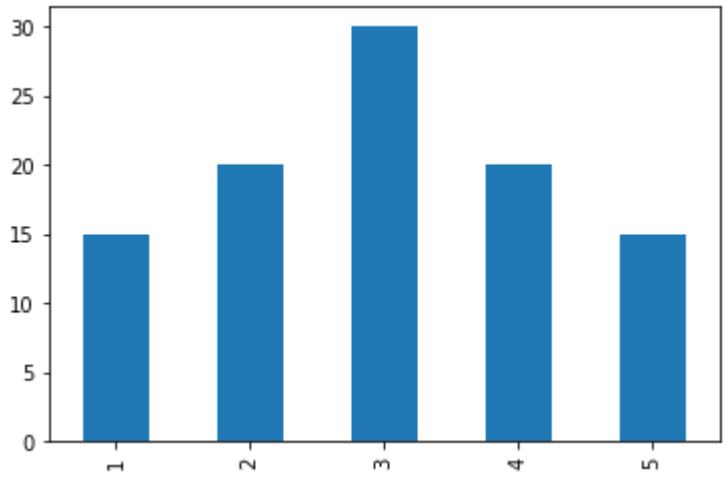
```
pd.Series(x1).value_counts(sort = False).plot(kind = 'bar')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb11bbc9110>
```



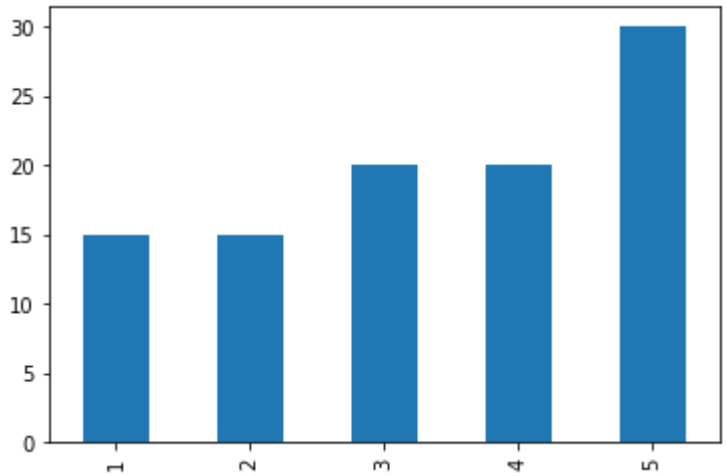
```
pd.Series(x2).value_counts(sort = False).plot(kind = 'bar')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f5f35feccd0>
```



```
pd.Series(x3).value_counts(sort = False).plot(kind = 'bar')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f5f35b2a9d0>
```



```
print("좌로 치우쳤을 때 왜도:", skew(x1))
print("치우치지 않았을 때 왜도:", skew(x2))
print("우로 치우친 왜도:", skew(x3))
```

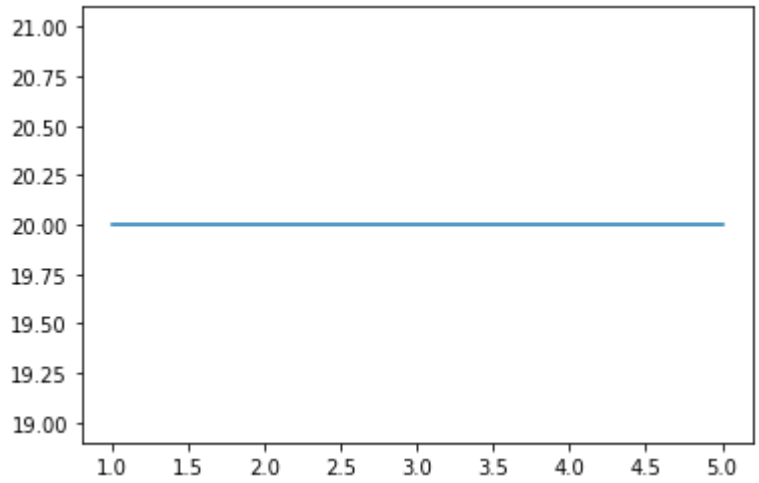
```
좌로 치우쳤을 때 왜도: 0.3192801008486361
치우치지 않았을 때 왜도: 0.0
우로 치우친 왜도: -0.31928010084863606
```

첨도 계산

```
x1 = [1] * 20 + [2] * 20 + [3] * 20 + [4] * 20 + [5] * 20 # 전혀 뾰족하지 않음
x2 = [1] * 10 + [2] * 20 + [3] * 40 + [4] * 20 + [5] * 10 # 조금 뾰족
x3 = [1] * 5 + [2] * 15 + [3] * 60 + [4] * 15 + [5] * 5 # 매우 뾰족
```

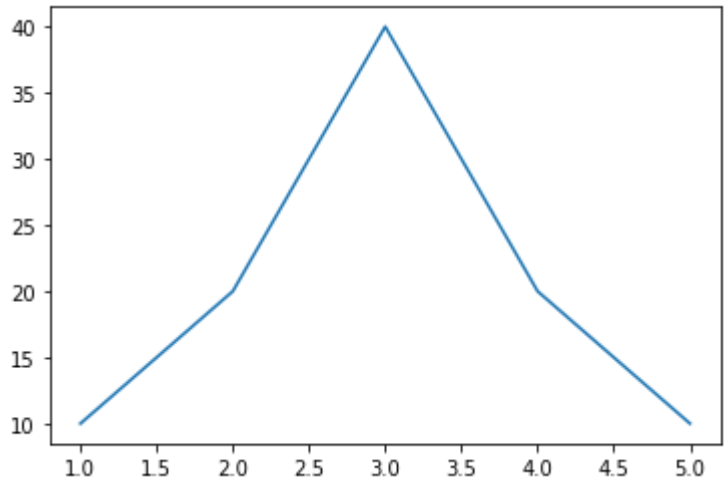
```
pd.Series(x1).value_counts(sort = False).plot(kind = 'line')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f5f358ef990>
```



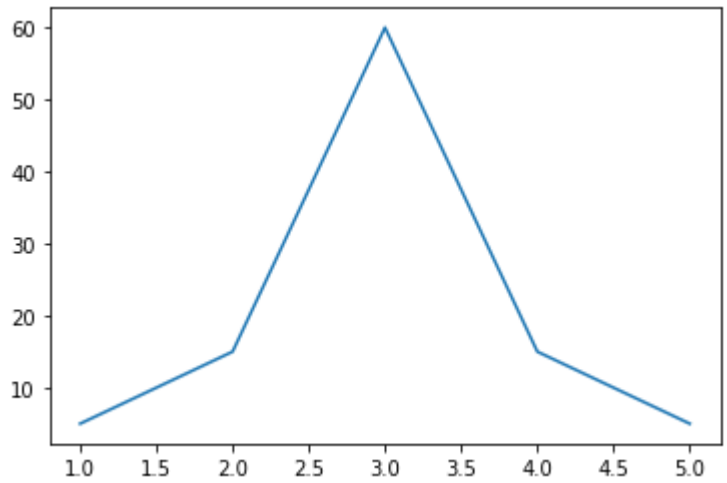

```
pd.Series(x2).value_counts(sort = False).plot(kind = 'line')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f5f35a36f90>
```




```
pd.Series(x3).value_counts(sort = False).plot(kind = 'line')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f5f35873810>
```




```
print("전혀 뾰족하지 않을 때 (평평할 때) 첨도:", kurtosis(x1))
```

```
print("전혀 뾰족하지 않을 때 (평평할 때) 첨도:", kurtosis(x1))
print("조금 뾰족할 때 첨도:", kurtosis(x2))
print("매우 뾰족할 때 첨도:", kurtosis(x3))
```

```
전혀 뾰족하지 않을 때 (평평할 때) 첨도: -1.3
조금 뾰족할 때 첨도: -0.5
매우 뾰족할 때 첨도: 0.8775510204081636
```