Problem1

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0.1 Lab1:

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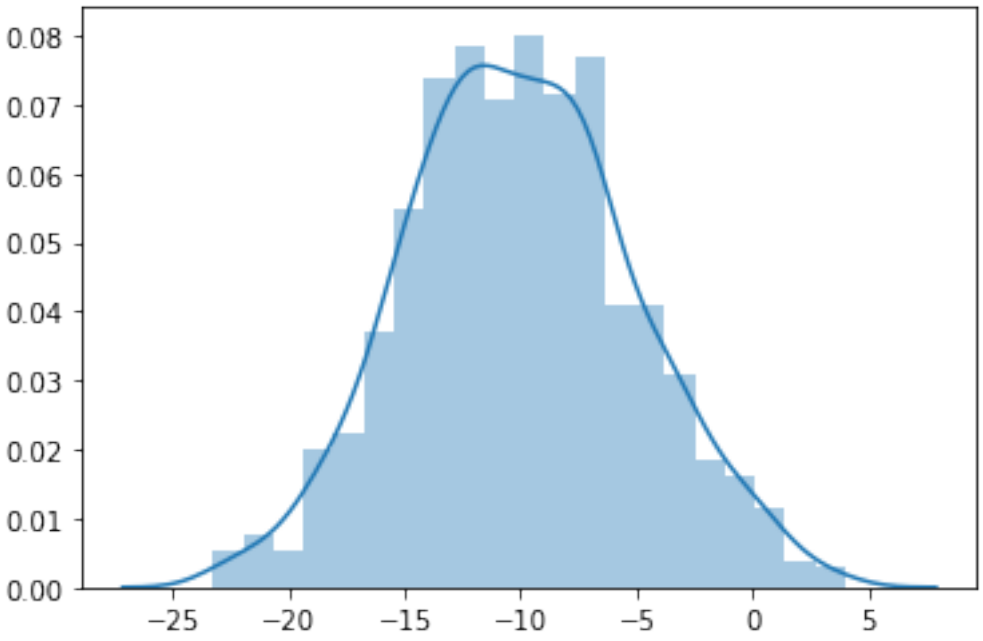
[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

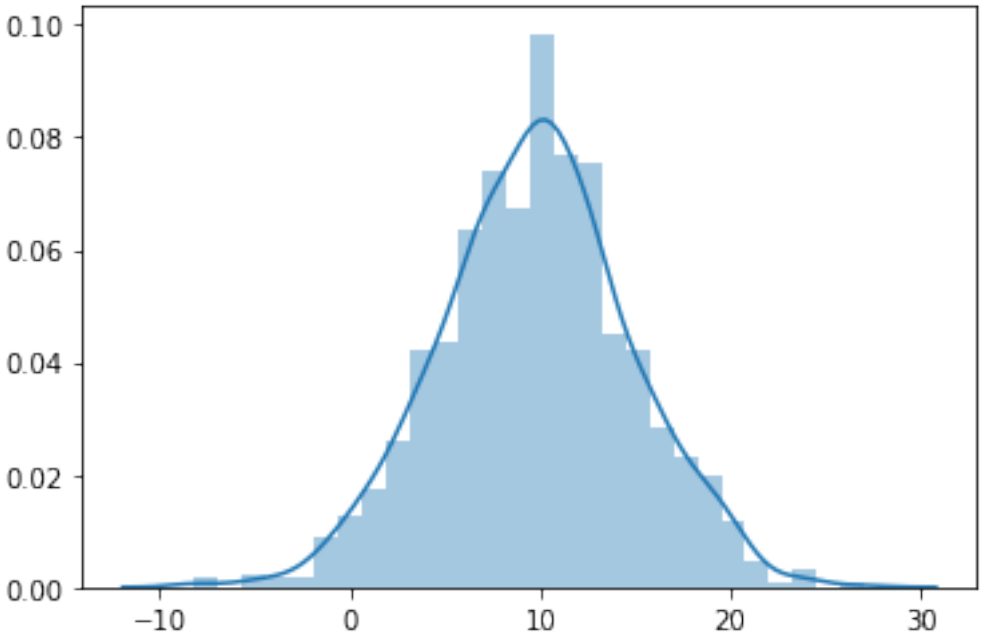
[3]:
```
mu1, sigma1 = -10, 5
s1 = np.random.normal(mu1, sigma1, 1000)
sns.distplot(s1)
```

[3]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1a17a00f90>
```



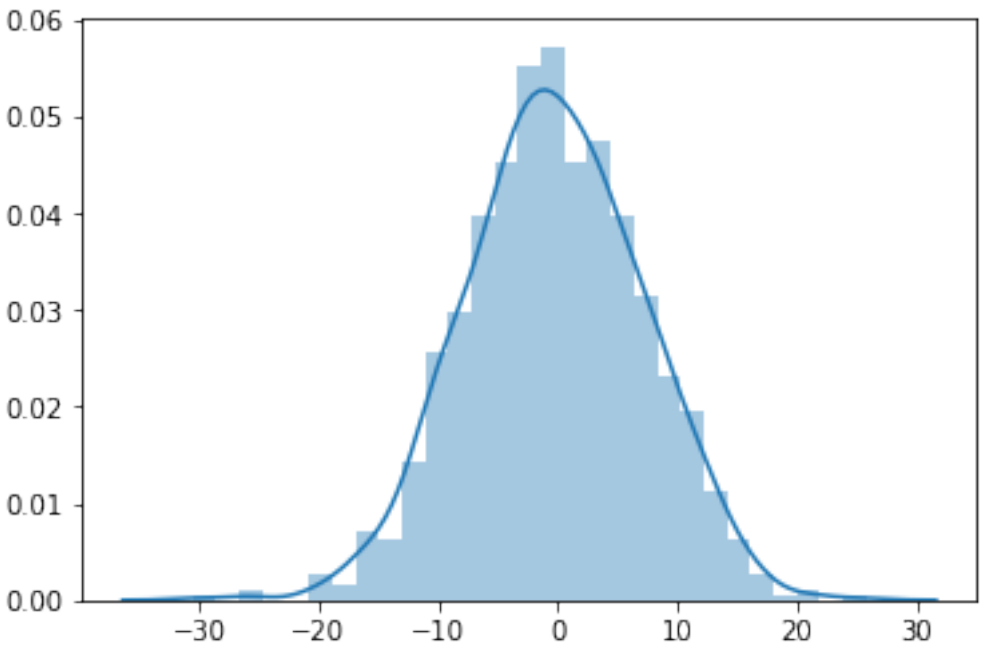
[4]:
```
mu2, sigma2 = 10, 5
s2 = np.random.normal(mu2,sigma2, 1000)
sns.distplot(s2)
```

[4]: <matplotlib.axes._subplots.AxesSubplot at 0x1a181af5d0>



[5]:
```
s3 = s1 + s2
sns.distplot(s3)
```

[5]: <matplotlib.axes._subplots.AxesSubplot at 0x1a1838c190>



Here we see that adding two gaussian distributions results in a graph that resembles a more true gaussian distribution. We estimate the mean to be 0 because the previous two distributions had mean -10 and 10 respectively. Also, we expect the variance of the new distribution to be 50 because the previous 2 distributions had variances of 25.

[8]:
```
np.mean(s3)
```

[8]:
```
-0.2995825907393885
```

[9]:
```
np.var(s3)
```

[9]:
```
54.76651224534895
```